MODULE 3.
MODEL QA PROJECT PLAN

This module ("the Model") serves as an example QA Project Plan. The Model was created for a fictitious tribe in Northern California who plans to conduct basic water quality monitoring on a river and its tributaries within tribal lands. The intent was to create a basic plan which included some field measurements, along with the collection of samples for analysis for basic water quality parameters (i.e., general chemistry, nutrients, and bacteria) plus metals. The project was assumed to be straightforward, with no legal implications. The tribal environmental team was assumed to consist of two individuals having multiple functions, a Project Manager/QA Manager and a Water Quality Technician/Field Sampler. Sample collection was planned to be directly into sample bottles rather than involving elaborate sampling equipment, as this was felt to be representative of most tribal water sampling efforts.

The Model follows the same basic structure as the Guidance and the Template provided, respectively, in Modules 1 and 2. Every effort has been made to make the three documents consistent (that is, the same section titles and numbers), although this may not be exact. It is recognized that every QA Project Plan is unique, so no guidance, template or model can capture all aspects of an individual tribe's water monitoring program.

> (Note: The contents of the appendices are not included. Instead, place holders are provided to show the type of supporting information that might be found in the appendices or attachments to a typical QA Project Plan. It was felt that including all the field sampling and measurement standard operating procedures (SOPs) and example chain of custody documentation would not be particularly useful when the same information is available elsewhere within the CD-ROM tool and can easily be copied and/or modified as needed. Also, since each tribe is responsible for acquiring its own contract laboratory's QA Plan or Manual and standard operating procedures (SOPs), inclusion of the associated fictitious analytical information was not felt to be helpful. A place holder was also provided for a Health & Safety Plan, an essential part of every project (but not necessarily a part of a QA Project Plan).

One important caveat is placed on the Model, which was prepared with input from four of EPA's ten regions. As regional policies with respect to QA Project Plan contents differ slightly, a project plan patterned exactly after the Model may not necessarily be accepted on the first review in each region. However, the use of national QA Project Plan guidance in the preparation of the Model (and also its use in preparing the Guidance and Template) should help ensure that a tribe's first effort generates a QA Project Plan with minimal comments requiring only minor revisions.

Quality Assurance Project Plan
for
Monitoring of Surface Water
Eagle Valley Reservation

Prepared by:
Eagle Valley Environmental Program
Eagle Valley Band of Indians
Eagle Valley Reservation
1234 Shadow Valley Road
Shadowland, Shasta County, California 99940

Prepared for:
US EPA Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

September 9, 2005

APPROVALS:

Eagle Valley Band Chairperson:	**Date:**
_____	_____
Eagle Valley Band Project Manager/ Quality Assurance Officer:	**Date:**
_____	_____
USEPA Region 9 Grants Project Officer:	**Date:**
_____	_____
USEPA Region 9 Quality Assurance Manager:	**Date:**
_____	_____

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1.0 PROJECT MANAGEMENT

This Quality Assurance (QA) Project Plan has been prepared for the monitoring of surface water by the Eagle Valley Band of Indians on the Eagle Valley Indian Reservation located in Shadowland, Shasta County, California. The surface water monitoring program is part of the Band's water quality management program developed under Section 319 of the Clean Water Act. This section of the QA Project Plan describes how the project will be managed, organized and implemented.

1.1 Title and Approval Page - See Page 1.

1.2 Table of Contents - See Pages 3 - 6.

1.3 Distribution List

The following is a list of organizations and persons who will receive copies of the approved QA Project Plan and any subsequent revisions:

Eagle Valley Environmental Program
Eagle Valley Band of Indians
1234 Shadow Valley Road
Shadowland, California 99940

Ivan Hopland
Environmental Resources Program Director
(877) 555-5555, ext. 23

Eva Mountain View
Project Manager/Quality Assurance Officer
(877) 555-5555, ext. 18

Byron Hollister
Water Quality Technician/Field Sampler
(877) 555-5555, ext. 15

U.S. Environmental Protection Agency (US EPA), Region 9
75 Hawthorne Street
San Francisco, California 94105

Janet Smithson
Grants Project Officer
mail code: PMD-3

(415) 972-3803

Eugenia McNaughton
Quality Assurance Manager
mail code: WTR-10
(415) 972-1111

North Face Analytical Laboratory
415 University Drive
Auburnville, California 94411

Richard Simons
Laboratory Project Manager
(916) 875-1225

1.4 Project Organization

The responsible agency for this surface water monitoring program is the Eagle Valley Environmental Program. The participating agency is the U.S. Environmental Protection Agency, Region 9 (USEPA). North Face Analytical Laboratory is the California state-certified laboratory that will be performing the chemical and microbiological analyses for the monitoring program following commonly used analytical methods. If, in the future, North Face Analytical Laboratory is no longer the laboratory and a new laboratory is selected, this QA Project Plan will be amended accordingly.

The roles and responsibilities of those involved in the implementation of the surface water monitoring program are described below. An organization chart for the project is shown as Figure 1-1.

<u>Eagle Valley Band Project Manager</u> is the responsible official who will oversee the entire surface water monitoring program and budget. She is also responsible for overall development of the sampling design and protocols discussed in this QA Project Plan, as well as ensuring protocols are followed. Prior to beginning the monitoring program, she will coordinate with the Eagle Valley Band Water Quality Technician/Field Sampler and the North Face Analytical Laboratory Project Manager to review field and laboratory roles and responsibilities, sampling and field measurement requirements, analytical requirements, sampling schedule, courier logistics (for sample transfer to the laboratory), and requirements for field and laboratory documentation to minimize potential problems that could occur during the project. She will also be responsible for ensuring that any amended versions of the QA Project Plan are distributed to the organizations and individuals listed in Section 1.3.

Eagle Valley Band Quality Assurance (QA) Officer is responsible for the QA/QC Quality Assurance/Quality Control (QA/QC) review of all data generated for the samples collected. She will receive all data reports from the analytical laboratory and will be their main contact regarding data quality issues and concerns. Since the tribe is not large enough to support a full-time QA Officer, the Eagle Valley Band Project Manager will function in the dual role of Project Manager and QA Officer for the Tribe.

Eagle Valley Band Water Quality Technician/Field Sampler is responsible for performing the sample collection and field measurement activities. He will also be responsible for all communications with the analytical laboratory regarding sample shipment and schedule.

North Face Analytical Laboratory is responsible for conducting all sample preparation and analytical activities, as well as reviewing the analytical data it generates, to ensure it is consistent with its QA/QC program defined in this QA Project Plan. The Laboratory Project Manager will oversee all laboratory-related activities, serve as the main contact for the Eagle Valley Band Project staff, and will have the prime responsibility for the laboratory work.

1.5 Problem Definition/Background

1.5.1 Background

The Eagle Valley Indian Reservation is located outside the town of Shawdowland, a rural area 25 miles northeast of Shasta in Shasta County, California (Figure 2-1). The Reservation encompasses a 40-square mile area; however, land ownership on the Reservation is checkerboard. Only 45 percent of the land is tribally owned, with 50 percent of that land held in trust by the United States government. The Eagle Valley Band of Indians population consists of 70 tribal members all of whom live on the Reservation. The Tribe received federal recognition from the Bureau of Indian Affairs (BIA) in 1991.

The Reservation is bordered on the north and east by Shasta Mountain and on the west by the town of Shadowland and unincorporated portions of Shasta County. The Shadow Valley River, which originates in Shasta Mountain, flows from northeast to southwest and bisects the Reservation (Figure 2-1) on its path to Lake Shasta. The entire Reservation is

located within the Shasta Watershed. Surface water resources within the Reservation include Shadow Valley River, as well as five creeks (Ono Creek, Snow Creek, Hot Springs Creek, Pepper Creek, and Rocky Creek) and numerous springs that drain into the Shadow Valley River (Figure 2-2).

The population of the Eagle Valley Indian Reservation consists of 70 tribal members (49 adults and 21 children) all of whom live on the Reservation. In addition, 103 non-tribal members (66 adults and 37 children) also live on the Eagle Valley Reservation. Many of the residents raise cows, goats, chickens, and other animals to supplement their food source. Residents also plant and harvest from six community gardens, as well as numerous individual household gardens within the Reservation. Eight of the residences have constructed their own private wells for irrigation and livestock watering purposes. These eight wells were all hand dug from 1953 to 1955 by Wellbourne Brothers. The depth of the wells range from 15 to 25 feet below ground surface. All eight wells are located one mile of the Shadow Valley River, within the river's watershed. The Shadow Valley River also provides an important cultural connection for the Eagle Valley Band of Indians, a river-based tribe who have lived in the area for generations. The river is abundant with Ono Trout, a fish of particular importance to the culture of the Eagle Valley people.

Currently, the Reservation includes approximately 75 homes, the Tribal Government Office, a community center (which houses a recycling center in a portion of the building), a Head Start school, a small health clinic, and a general store. Approximately 60 percent of the adult residents work in the city of Shasta and neighboring communities, while 5 percent work in either Shadowland or on the Reservation.

The residents of the Eagle Valley Indian Reservation are serviced by the Shadowland Community Services District (SCSD), who provide both drinking water and trash hauling services. Sewage from homes and community buildings within the Reservation are served entirely by individual septic systems.

The Shadow Valley River is the primary source of drinking water for the residents on the Reservation, as well as for the town of Shadowland. The river is not a direct source of drinking water. The SCSD pumps water from the river for treatment and distribution to the Reservation. Based on monitoring required under the Safe Drinking Water Act, available analytical data from the SCSD water treatment and distribution system indicate there have been no detectable concentrations of any analytes since the system was put

in place in 1981. (Note: Drinking water concerns are beyond the scope of this current project.)

1.5.2 Problem Definition

The surface waters on the Eagle Valley Reservation are important tribal resources. The Shadow Valley River is a cultural resource to the Eagle Valley Band of Indians. To date, however, there has not been an adequate assessment of the quality of the Reservation's surface waters or evaluation of the surface waters for potential sources of contamination.

The Eagle Valley Band of Indians is concerned about the effect present land use (e.g., septic systems, livestock, agriculture, etc.) may have on the Shadow Valley River. Since the Shadow Valley River is integral to the Band's cultural and economic life, any current or potential future impairment of the river needs to be identified.

Surface water monitoring is needed to provide a baseline of the current conditions of Shadow Valley River, as well as to track changes in water quality over time. The long-term use of the surface water monitoring data would be to provide information to help the Band establish water quality standards and other tribal regulations and ordinances for the Eagle Valley Indian Reservation.

1.6 Project/Task Description and Schedule

A total of 10 locations will be sampled for this surface water quality monitoring program. All the locations will be along the Shadow Valley River. One location will be upstream of the Reservation and 9 locations will be within the Reservation boundaries spanning the river's length from the northeast to the southwest corners of the property (Figure 2-2). All sampling locations are accessible using a 4-wheel drive vehicle. All samples will be collected as grab samples from the shoreline at a depth of 6 to 12 inches, and all sampling locations will be recorded using global positioning system (GPS) equipment.

Samples will be sent to the off-site laboratory for analysis of the following parameters: 17 selected metals, hardness, anions (i.e., chloride, nitrate, nitrite, phosphate, and sulfate), total dissolved solids (TDS), alkalinity, total coliform, and e. coli. Samples from each location will also be field tested for temperature, pH, dissolved oxygen, conductivity (reported as specific conductance), and turbidity.

The monitoring program will be conducted quarterly for a period of 5 years. Samples will be collected every three months (i.e., March, June, September, and December of each calendar year). The initial monitoring is scheduled to begin in December 2005. Due to the climate and terrain in the area, no sampling events will be conducted within 3 days following any rain event.

Based on the number and locations of the samples to be collected, the sample collection is expected to take 2 days to complete. During field sampling, the Eagle Valley Band Water Quality Technician/Field Sampler will be in daily contact with the Eagle Valley Band Project Manager and the North Face Analytical Laboratory Project Manager. The Eagle Valley Band Field Sampler will notify the Eagle Valley Band Project Manager once the sampling is complete and the samples are being shipped to North Face Analytical Laboratory.

The annual schedule to support this 5-year study (with the first round of sampling beginning in December 2005) is as follows:

Prior to Sample Collection:

- **May - Jul 2005: Design project strategy**
- **Aug 15, 2005: Submit Draft QA Project Plan**
- **Sep 15, 2005: Receive review comments on QA Project Plan from USEPA**
- **Nov 1, 2005: Submit Final QA Project Plan**
- **Nov 15, 2005: Obtain QA Project Plan approval**

December 2005 Sampling Round:

- **Dec 1 - 15: Collect samples (2 days event) & take field measurements**
- **Dec 16 - Jan 15: Analyze samples at laboratory**
- **Jan 16 - Jan 31: Evaluate data**
- **Feb 1 - Feb 15: Summarize & tabulate data**
- **Mar 15: Write Quarterly Report**

March 2006 Sampling Round:

- **Mar 1 - 15: Collect samples (2 days event) & take field measurements**
- **Mar 16 - April 15: Analyze samples at laboratory**
- **April 16 - April 30: Evaluate data**
- **May 1 - May 15: Summarize & tabulate data**

Mar 15: Write Quarterly Report

June 2006 Sampling Round:

June 1 - 15: Collect samples (2 days event) & take field measurements
June 16 - July 15: Analyze samples at laboratory
July 16 - July 31: Evaluate data
Aug 1 - Aug 15: Summarize & tabulate data
Sept 15: Write Quarterly Report

September 2006 Sampling Round:

Sept 1 - 15: Collect samples (2 days event) & take field measurements
Sept 15 - Oct 15: Analyze samples at laboratory
Oct 16 - Oct 31: Evaluate data
Nov 1 - Nov 15: Summarize & tabulate data
Nov 15 - Nov 30: Write Annual Report

Other Sampling Rounds (through Dec 2010): Follow similar schedule as above.

1.7 Quality Objectives and Criteria for Measurement Data

This section describes the objectives of the project (i.e., decision or study questions to be answered), identifies the targeted action limits/levels, and defines the measurement performance or acceptance criteria deemed necessary to meet those objectives.

1.7.1 Objectives and Project Decisions

The surface water monitoring program is designed to characterize the surface water resources of the Eagle Valley Band of Indians. The baseline data generated from the first year of quarterly sampling will provide valuable information about the current condition of the water resources, particularly the Shadow Valley River. On-going monitoring, conducted for the following 4 years, will allow the Band to begin to track changes in water quality over time and to assess potential future environmental impacts to the Reservation's surface waters. The long-term use of the surface water monitoring

program is to provide information to help the Band establish water quality standards and other tribal regulations and ordinances for the Eagle Valley Indian Reservation.

Since no tribal water quality standards currently exist, data collected will be compared to national water quality standards presented as Project Action Limits (PALs) in Table 1-1. Decisions to be made with the data include:

- **If data for any analyte or field parameter (from an individual location or single quarterly sampling event) are found to exceed the national water quality standards, then the tribal council will be notified.**
- **If data are found to exceed the national water quality standards for two consecutive quarterly sampling events and/or appear to be increasing with time, then the tribal council will be notified and a plan for future investigations of potential sources will be discussed.**
- **If waters flowing onto the reservation are impaired (i.e., exceed the national water quality standards), the issue will be brought to the attention of the tribal council for possible discussion with the US EPA Project Officer.**

1.7.2 Action Limits/Levels

Since no tribal water quality standards currently exist for the Shadow Valley River, national water quality standards will be used to evaluate the quality of the river's water and serve as the Project Action Limits (PALs). Table 1-1 provides a listing of the parameters to be sampled and the associated PALs. The information demonstrates that the analytical methods selected for this project are capable of providing data with quantitation limits (QLs) reported to concentrations lower than the national water quality standards for the majority of the parameters of interest, and therefore the data generated will be able to support sound decisions at the PALs. In addition, Table 1-1 also provides a summary of the laboratory's analytical detection limits (DLs), those minimum concentrations that can be detected above instrumental background or baseline/signal noise, providing further assurance that the analytical methods are capable of meeting the data needs of the project in terms of sensitivity (see end of Section 1.7.3). The only exceptions to this are a few of the metals (i.e., cadmium, copper, selenium, silver, and

zinc) with PALs less than the laboratory's QLs and DLs. However, due to the initial and exploratory nature of the current study, this is not expected to be a problem.

Table 1-1 provides additional information related to the field measurements to be conducted. No national water quality standards apply to these field measurements. The QLs listed, as well as the measurement ranges associated with each field parameter (based on information provided in the respective equipment manufacturers identified in Table 2-5), are deemed acceptable to meet the project objectives.

1.7.3 Measurement Performance Criteria/Acceptance Criteria

In order to support project decisions, data generated must be of known and acceptable quality. To define acceptable data quality for this project, data quality indicators (DQIs) were identified for each analytical parameter, and decisions were made regarding how each DQI would be assessed. The DQIs include: precision, accuracy/bias (as related to %recovery and contamination), representativeness, comparability, completeness, and sensitivity.

The general approach to assessing each DQI is described below. Some DQIs will be assessed quantitatively, while others will be assessed qualitatively. For quantitative assessments, example calculations have been provided and the QC samples (to assess each DQI) have been identified.

The frequency of the QC samples and the measurement performance criteria for each QC sample for each type of analysis are provided in Tables 2-4A through 2-4E. For quantitative assessment of laboratory methodology, the laboratory's QA Manual and analytical SOPs have been reviewed by the tribe's project team, and the associated laboratory QC (types & frequencies of QC samples and QC acceptance limits) have been determined to be adequate to meet the data quality needs of the project. As such, the laboratory QC have been accepted as the project's measurement performance criteria for the analytical component, while project-specific criteria have been defined to assess the field sampling component.

For field measurements, the DQIs to be assessed quantitatively include precision and accuracy alone. The associated acceptance criteria (types & frequencies of QC checks and acceptance limits) for the project are summarized in Table 2-5.

GENERAL APPROACH:

Precision - Precision will be assessed quantitatively with duplicate samples and expressed as relative percent difference (RPD) by the following equation:

$$RPD\ (\%) = \frac{|X_1 - X_2|}{(X_1 + X_2)/2} \times 100$$

where,

RPD (%) = relative percent difference
X_1 = Original sample concentration
X_2 = Duplicate sample concentration
$|X_1 - X_2|$ = Absolute value of $X_1 - X_2$

To assess precision associated with all steps of the project (from sample collection through analysis) field duplicates will be collected and analyzed. Field duplicates will be collected at a frequency of 10% (1 duplicate/10 field samples) for each analytical parameter and 5% (1 duplicate each of 2 days/10 field samples) for each field measurement parameter. To assess laboratory precision alone, laboratory duplicates will be prepared and analyzed at a 5% frequency.

Accuracy/Bias - Accuracy/bias will be assessed as related to recovery, as well as in regards to potential contamination sources. Both of these terms will be evaluated quantitatively.

Accuracy/bias related to recovery is an assessment of the laboratory analytical methods alone. For Laboratory Control Samples (LCS), it will be expressed as % Recovery by the following equation:

$$\%\ Recovery = \frac{X}{T} \times 100$$

where,

X = Measured concentration
T = True spiked concentration

or, for Matrix Spike (MS) samples, by the following equation:

$$\% \text{ Recovery} = \frac{(B - A)}{T} \times 100$$

where,

B = Measured concentration of spiked sample

A = Measured concentration of unspiked sample

T = True spiked concentration

The frequency of the LCS and/or MS samples associated with the analytical parameters will be one for every 20 samples or 5%. No LCS or MS samples will be analyzed as part of the field measurements.

Accuracy/bias as related to contamination involves both a field sampling and laboratory component. To assess all steps of the project (from sample collection through analysis), field blanks will be collected and analyzed. Field blanks are planned to be collected at a frequency of 5% (or 1 blank/20 field samples) for off-site analysis of metals and anions. To assess potential laboratory contaminant sources alone, laboratory blanks will be prepared and analyzed at a one per batch or 5% frequency. No blanks will be analyzed as part of the field measurements.

Another way to measure accuracy is through the use of performance evaluation samples. These are samples containing analytes whose concentration is known to the tribe, but not to the laboratory. However, submission of performance evaluation samples to the laboratory is presently outside the scope and budget of the tribe's water monitoring program. It is also felt that, given the planned use of the data by the tribe for its internal purposes, that performance evaluation samples are not warranted at this time. If performance evaluation samples are deemed necessary in the future, the tribe would acquire the samples from commercial sources and would rely on the preparer of the samples to establish acceptance criteria, whether that were EPA, the state, or a commercial supplier.

<u>Representativeness</u> - Representativeness, or the ability of a sample to represent the environmental conditions at the time of collection, will be assessed both quantitatively and qualitatively.

To assess this term quantitatively, an overall evaluation will be made of how well the precision and accuracy/bias assessments met their associated measurement performance criteria. An additional assessment will involve ensuring that a temperature blank sample has accompanied each cooler of samples that has a temperature requirement associated with its preservation (see Table 2-3) and that the temperature of these temperature blank samples are 4°C ± 2°C when received at the laboratory.

To assess this term qualitatively, no actual QC samples are involved. Instead, the evaluation will involve verifying that documented sample collection and analytical methods (including sample handling and chain-of-custody procedures, sample preservation, and sample holding time protocols) were followed.

The procedures identified throughout this QA Project Plan were chosen to optimize the potential for obtaining samples that reflect the true state of the environment, within practical limits. In addition, efforts were made in developing the sampling design to ensure samples would be collected along the length of the Shadow Valley River (so that the overall condition of all of the tribe's waters can be assessed) and during different times of the year (so the effect of seasonal changes will be captured).

Data collected for this project would provide a perspective on the water quality of the Shadow Valley River. Long-term monitoring will increase the representativeness of the project in that it would enable an assessment of changes over time. Basically, the more sampling events, the more statistically representative the collected data will be of the area.

<u>Comparability</u> - Comparability, or the degree to which data from different studies or methodologies agree, will be assessed qualitatively.

Comparability expresses the confidence with which one data set can be compared to another. It describes the ability and appropriateness of making collective decisions with two or more data sets. Many variables may affect the descriptive value of the data. These include:

- **Variables of interest in each data set**
- **Use of common units**
- **Similarity of methods and QA**
- **Time frames**

- Season
- Weather
- Equipment

These variables are addressed by describing the project objectives and activities planned under the project.

The analytical methods to be used by North Face Analytical Laboratory will be EPA Methods or Standard Methods, both well-documented and published methods for surface water analyses. In addition, the analytical reports will be in consistent units of measure, such as milligrams per liter (mg/l) or micrograms per liter (µg/l). Table 2-3 lists the analytical parameters to be sampled and the methods to be used for the analysis, as well as the field measurements.

Completeness - Completeness, the amount of valid data obtained compared to the planned amount, may be assessed quantitatively and/or qualitatively.

To assess the term quantitatively, % Completeness will be expressed by the following equation:

$$\% \text{ Completeness} = \frac{N}{T} \times 100$$

where,

N = Number of usable results
T = Total targeted number of samples planned to be collected

All data collected in this project will be used to determine the quality of Shadow Valley River water. Due to a variety of circumstances, sometimes not all samples scheduled to be collected can be collected (e.g., a creek may be dry, etc.) or the data from the samples cannot be used (e.g., samples are or bottles are broken in transit, sample holding times are grossly exceeded, etc.). For this surface water sampling project, the overall completeness goal has been set at 90% for each analytical parameter and field measurement type. If the completeness goal is not met, re-sampling and/or re-analyzing will be conducted.

At this point in time, no sampling locations have been deemed more critical to the overall project goal than any other. As such, there will be no qualitative assessment of

completeness to ensure that samples from critical locations have been collected and their associated data has been deemed usable to support the project objectives.

Sensitivity - Sensitivity, or the ability of a method to detect and quantify an analytical parameter of concern at the concentration level of interest, will be assessed semi-quantitatively. No actual QC samples are involved. Instead, the laboratory to perform the analyses has provided their QLs and DLs (as discussed in Section 1.7.2) and demonstrated that these are lower than the respective national water quality standards serving as the project action limits (as shown in Table 1-1), for the majority of the analytical parameters. For field measurements, the sensitivity is defined by the instrument manufacturer.

1.8 Special Training Requirements/Certification

1.8.1 Field Sampling and Measurement Personnel

No special training of field personnel is required for this project. The Eagle Valley Band Water Quality Technician/Field Sampler conducting all the field activities is an experienced staff member who has been supporting similar activities for 5 years. He completed the tribal health and safety training, related to collecting surface water samples and handling potentially hazardous materials, in December 1999. Health and safety training records are kept on file at the Eagle Valley Environmental Resources Program office and in personnel files.

1.8.2 Laboratory Personnel

No special training of laboratory personnel is required for this project. The training protocols outlined in the laboratory's Quality Assurance Manual (QA Manual), included in Appendix B, ensure that personnel performing designated tasks have participated in rigorous and ongoing training associated with those tasks. Records of laboratory personnel training and are maintained at the laboratory.

1.9 Documents and Records

1.9.1 QA Project Plan Distribution

It is the responsibility of the Eagle Valley Band Project Manager/QA Officer to prepare and maintain amended versions of the QA Project Plan and to distribute the amended QA Project Plan to the individuals listed in Section 1.3.

1.9.2 Field Documentation and Records

In the field, records will be documented in several ways, including field logbooks, photographs, pre-printed forms (such as labels and chain-of-custody forms), corrective action reports, and field audit checklists and reports. Field activities must be conducted according to the appropriate SOPs (Appendix A). It is the responsibility of the Eagle Valley Band Project Manager/QA Officer to maintain updated revisions of SOPs at all times and to distribute updated SOPs to the Eagle Valley Band Field Sampling Technician, as appropriate. All documentation generated by the sampling program will be kept on file in the office of the Eagle Valley Environmental Program.

1.9.2.1 Field Notebooks

Bound field logbooks will be used to record field observations, sampling site conditions, and on-site field measurements. These books will be kept in a permanent file in the office of the Eagle Valley Environmental Program. At a minimum, information to be recorded in the field logbooks at each sample collection/measurement location includes:

- **Sample location and description,**
- **Site or sampling area sketch showing sample location and measured distances,**
- **Sampler's names,**
- **Date and time of sample collection,**
- **Designation of sample as composite or grab (for this project, all are grab samples),**
- **Type (media or matrix) of sample (for this project, all are surface water samples),**
- **Type of sampling equipment used (for this project, only sample bottles will be used),**

- **Type of field measurement instruments used, along with equipment model and serial number,**
- **Field measurement instrument readings,**
- **Field observations and details related to analysis or integrity of samples (e.g., weather conditions, noticeable odors, color),**
- **Preliminary sample descriptions (e.g., clear water with strong ammonia-like odor),**
- **Sample preservation,**
- **Lot numbers of the sample containers, sample identification numbers and any explanatory codes,**
- **Shipping arrangements (overnight air bill number), and**
- **Name(s) of recipient laboratory(ies).**

In addition to the sampling information, the following specific information will also be recorded in the field logbook for each day of sampling:

- **Team members and their responsibilities,**
- **Time of arrival/entry on site and time of site departure,**
- **Other personnel on site,**
- **Deviations from the QAPP or SOPs required in the field, and**
- **Summary of any meetings or discussions with tribal, contractor, or federal agency personnel.**

Separate instrument/equipment notebooks or logbooks will be maintained for each piece of equipment or instrument. These logbook will be used to record field instrument calibration and maintenance information. Each logbook with include the name, manufacturer, and serial number of the instrument/equipment, as well as dates and details of all maintenance and calibration activities.

1.9.2.2 Photographs

Digital photographs will be taken at each sampling location and at other areas of interest near the sampling area for every sampling event. The photographs will serve to verify information entered into the field logbook. Digital photographs will be archived in a permanent digital file to be kept in the office of the Eagle Valley Environmental Program.

For each photograph taken, the following information will be written in the field logbook or recorded in a separate field photography logbook:

- **Time, date, location, and weather conditions,**
- **Description of the subject photographed,**
- **Direction in which the picture was taken, and**
- **Name and affiliation of the photographer.**

1.9.2.3 Labels

All samples collected will be labeled in a clear and precise way for proper identification in the field and for tracking in the laboratory. North Face Analytical Laboratory will provide sample labels (see Appendix A-4) for this project. The samples will have preassigned, identifiable, and unique numbers. At a minimum, the sample labels will contain the following information:

- **Sampling location or name,**
- **Unique sample number,**
- **Sample description (e.g., grab, composite),**
- **Date and time of collection,**
- **Initials/signature of sampler,**
- **Analytical parameter(s), and**
- **Method of preservation.**

Each sample location will have a unique sample identification number.

1.9.2.4 Field Quality Control Sample Records

Field QC samples (duplicates and blanks) will be labeled as such in the field logbooks. They will be given unique (fictitious) sample identification numbers and will be submitted "blind" to the laboratory (i.e., only the field logbook entry will document their identification and the laboratory will not know these are QC samples). The frequency of QC sample collection will also be recorded in the field logbook.

1.9.2.5 Sample Chain-of-Custody Forms and Custody Seals

Chain-of-custody forms and custody seals (see Appendix A-4) will be provided by the laboratory. The forms will be used to document collection and shipment of samples for off-site laboratory analysis, while the seals will serve to ensure the integrity of (i.e., there has been no tampering with) the individual samples.

All sample shipments will be accompanied by a chain-of-custody form. The forms will be completed and sent with each shipment of samples to the laboratory. If multiple coolers are sent to a laboratory on a single day, forms will be completed and sent with the samples for each cooler. The original form will be included with the samples and sent to the laboratory. Copies will be sent to the Eagle Valley Band Project Manager/QA Officer.

The chain-of-custody form will identify the contents of each shipment and maintain the custodial integrity of the samples. Generally, a sample is considered to be in someone's custody if it is either in someone's physical possession, in someone's view, locked up, or kept in a secured area that is restricted to authorized personnel. Until the samples are shipped, the custody of the samples will be the responsibility of the field personnel, who will sign the chain-of-custody form in the "relinquished by" box and note the date, time, and air bill number.

A self-adhesive custody seal will be placed across the lid of each sample container/bottle. The shipping containers in which samples are stored will also be sealed with self-adhesive custody seals any time they are not in someone's possession or view before shipping, as well as during shipping. All custody seals will be signed and dated.

Procedures for completion and distribution of the chain-of-custody forms, as well as the use and placement of the custody seals, is included in Appendix D.

1.9.3 Laboratory Documentation and Records

The analytical laboratory will keep a sample receiving log and all completed chain-of-custody forms submitted with the samples collected for this project. The analytical laboratory will also keep records of all analyses performed, as well as associated QC information, including: laboratory blanks, matrix spikes, laboratory control samples, and

laboratory duplicates. Hard copy data of the analytical results will be maintained for six years by the laboratory.

The data generated by the laboratory for each sampling event will be compiled into individual data packages/reports. The data packages will include the following information:

- **Project narrative including a discussion of problems or unusual events (including but not limited to the topics such as: receipt of samples in incorrect, broken, or leaking containers, with improperly or incompletely filled out chain-of-custody forms, with broken chain-of-custody seals, etc.; receipt and/or analysis of samples after the holding times have expired; summary of QC results exceeding acceptance criteria; etc.),**
- **Sample results and associated QLs,**
- **Copies of completed sample receiving logs and chain-of-custody forms, and,**
- **QC check sample records and acceptance criteria (to be included for all QC samples listed in Tables 2-4A through 2-4E, including the temperature blank check).**

All data packages will be reviewed by the Laboratory QA Officer to ensure the accurate documentation of any deviations from sample preparation, analysis, and/or QA/QC procedures; highlights of any excursions from the QC acceptance limits; and pertinent sample data. Once finalized, the Laboratory QA Officer will provide the data packages/reports to the Laboratory Project Manager who will sign them and submit them to the Eagle Valley Band Project Manager/QA Officer. Any problems identified by the Laboratory QA Officer will be documented in the narrative part of the tribe's report.

Information about the documentation to be provided by analytical laboratory is also contained in the laboratory's QA Manual (Appendix B).

1.9.4 Technical Reviews and Evaluations

As part of the QA efforts for the project, on-going technical reviews will be conducted and documented. These reviews are associated with both field activities and the data generated by the off-site laboratory.

1.9.4.1 Field Audit Reports

The Eagle Valley Band Project Manager/QA Officer will observe selected sampling events to ensure that sample collection and field measurements are going according to plan. The results of the observations will be documented in a designated QA Audit Logbook. Once back in the office, the Eagle Valley Band QA Officer will formalize the audit in a Field Audit Report to be forwarded to the Eagle Valley Environmental Resources Program Director and the Eagle Valley Band Water Quality Technician/Field Sampler.

1.9.4.2 Corrective Action Reports (following Field Audits)

Corrective action reports will be prepared by the Eagle Valley Band Water Quality Technician/Field Sampler in response to findings identified by the Eagle Valley Band Project Manager/QA Officer during field visits and audits. The reports will focus on plans to resolve any identified deficiencies and non-compliance issues that relate to on-going activities and problems of a systematic nature, rather than on one time mistakes. Corrective Action reports do not have a specific format, but will be handled as an internal memorandum.

1.9.4.3 Field Activities Review Checklist

At the end of each sampling event, a technical review will be conducted of field sampling and field measurement documentation to ensure that all information is complete and any deviations from planned methodologies are documented. This review is described in Section 3.1.1.3. The review, as well as comments associated with potential impacts on field samples and field measurement integrity, will be documented on a Field Activities Review Checklist (as provided in Figure 3-1.)

1.9.4.4 Laboratory Data Review Checklist

Following receipt of the off-site laboratory's data package for each sampling event, The Eagle Valley Band QA Officer will conduct a technical review of the data to ensure all information is complete, as well as to determine if all planned methodologies were followed and QA/QC objectives were met. The results of this review, as well as comments associated with potential impacts on data integrity to

support project decisions, will be documented on a Laboratory Data Review Checklist (as provided in Figure 3-2).

1.9.5 Quarterly and Annual Reports

The Eagle Valley Project Manager/QA Officer is responsible for the preparation of quarterly reports (one associated with each of December, March, & June sampling events) and annual reports (following the September sampling events and summarizing the year's activities) to be submitted to the US EPA Grants Project Officer.

The quarterly report should include, at a minimum:

- **Table summarizing the results (including both laboratory data and field measurements),**
- **Final laboratory data package (including QC sample results),**
- **Brief discussion of the field and laboratory activities, as well as any deviations or modifications to the plans,**
- **Copies of Field Audit Reports and any associated Corrective Action Reports,**
- **Copies of Field Activities Review Checklists and Data Review Checklists,**
- **Discussion of any problems noted with the data, either from laboratory or field measurements,**
- **Discussion of any data points showing exceedences of Action Levels, and**
- **Recommendations/changes for the next sampling event.**

The annual reports should include, at a minimum:

- **Description of the project,**
- **Table summarizing the results (of all project data collected to date, including both laboratory data and field measurements),**
- **Final laboratory data package for the fourth quarter (including QC sample results),**
- **Discussion of the field and laboratory activities, as well as any deviations or modifications to the plans,**
- **Trends observed as a result of the year's monitoring efforts,**
- **Copies of Field Audit Reports and any associated Corrective Action Reports (for the fourth quarter),**

- **Copies of Field Activities Review Checklists and Data Review Checklists (for the fourth quarter),**
- **Evaluation of the data in meeting the project objectives, including data exceeding Action Levels,**
- **Recommendations to the Tribal Council regarding exceedances which are occurring on an on-going basis, and**
- **Recommendations/changes for future project activities (e.g., adding/deleting sampling locations and/or analyses, modifications to SOPs, amendments to the QA Project Plans, etc.).**

The quarterly reports are to be submitted approximately sixty days after the completion of each sampling event. The annual reports are to be submitted in lieu of the last quarterly report for each year and are inclusive of the entire year's activities.

2.0 DATA GENERATION AND ACQUISITION

This section of the QA Project Plan describes how the samples will be collected, shipped, and analyzed.

2.1 Sampling Design (Experimental Design)

A total of 10 locations will be sampled for this surface water monitoring program. All the locations will be along the Shadow Valley River. One location will be upstream of the Reservation boundaries and 9 locations will be within the Reservation boundaries spanning the river's length from the northeast to the southwest corners of the property (Figure 2-2). The sample locations, names, and rationale for selecting each sampling location are included in Table 2-1. The samples to be collected are summarized in Table 2-2.

All sampling locations are accessible using a 4-wheel drive vehicle. All samples will be collected from the shoreline, and all sampling locations will be recorded using global positioning system (GPS) equipment following the procedures included in Appendix A-3.

The initial (baseline) monitoring program will include quarterly analyses at the 10 locations identified on Table 2-1 and shown on Figure 2-2. Analyses will include for 17 selected metals, hardness, anions (i.e., chloride, nitrate, nitrite, phosphate, and sulfate), total dissolved solids (TDS), alkalinity, total coliform, and e. coli. Samples from each

location will also be field tested for temperature, pH, dissolved oxygen, conductivity (as specific conductance), and turbidity. Samples will be collected in March, June, September, and December of each calendar year over a 5-year period. In addition, a parameter may be removed from the monitoring program if the sampling results indicate it is not of concern or added if new land uses develop after the monitoring program begins or the monitoring data indicates other potential parameters to include.

Water samples will be collected from the most upstream point (Upstream/SW-1) to the most downstream point (Southwest Border/SW-10). This rationale is being used since the most upstream sampling point on the Shadow Valley River is assumed to be the least impacted by current land use activities while the most downstream point is assumed to be most impacted by current land use. However, the rationale could change depending on the results from subsequent sampling events. If the sample collection order changes, this will be noted in the quarterly reports to the US EPA Grants Project Manager and documented in an amendment to the QA Project Plan.

2.2 Sampling Methods

2.2.1 Surface Water Sampling

All samples will be collected using the field SOPs included in Appendix A-1. If an SOP is updated or revised, the updated or revised SOP will be used for the subsequent sampling event(s). Any revisions/updates to SOPs will be documented in an amendment to the QA Project Plan.

Water samples will be collected 6 - 12 inches below the water's surface. At each sampling location, all sample bottles/containers designated for a particular analysis (e.g., anions) will be filled sequentially before containers designated for another analysis are filled (e.g., metals). If a QC sample is to be collected at a given location, all containers designated for a particular analysis for both the sample and QC sample will be filled sequentially before containers for another analysis are filled. For field duplicate samples, containers with two different sample designations (e.g., metals designation SW-1 and metals designation SW-11 [duplicate of SW-1]) will be filled alternately.

All water samples will be collected directly from the Shadow Valley River into sample bottles/containers appropriate for the specific analysis or field measurement. All the sampling locations are accessible from the shoreline or with minimal wading into the

stream downstream of the sample collection point. Preservatives will be added after sample collection, if required, to avoid losing the preservatives and dilution of preservatives during sampling. The pH of the metal samples will be checked after addition of nitric acid to ensure that sufficient acid was added to achieve the pH<2 required. Once the samples are collected and preserved, they will be kept chilled (if appropriate) and processed for shipment to the laboratory. Care will be taken to not touch the lip of the sample bottle during sample collection and preservation, so as not to potentially contaminate the sample. Table 2-3 summarized the sample bottle/containers, volumes, and preservation requirements for each analysis and field measurement.

2.2.2 Field Health and Safety Procedures

A project-specific Health and Safety Plan has been prepared and is included as Appendix E. A brief tail-gate safety meeting will be held the first day of each sampling event to discuss emergency procedures (e.g., location of the nearest hospital or medical treatment facility), local contact information (e.g., names and telephone numbers of local personnel, fire department, police department), as well as to review the tribe's contingency plan. All field sampling activities will be conducted with a buddy system (i.e., two field personnel will constitute the sampling team). This will allow for the presence of a second person to provide assistance and/or call in an emergency or accident for the other field person, if/when needed.

Level D personal protective equipment (PPE) will be used when collecting the surface water samples. At a minimum, safety glasses, plastic gloves, and steel-toed rain boots or waders will be worn. When wading, care will be taken to avoid slipping on rocks and algae. Also, due to weather conditions during the sampling events and the possibility of health concerns (e.g., heat stress) from working in high temperatures, field personnel will be advised to drink plenty of water and wear clothing (e.g., hat, long-sleeved shirt) that will cover and shade the body.

Potential routes of exposure related to field sampling and measurement activities are through the skin (e.g., from direct contact from the surface water) and/or by ingestion (e.g., from not washing up prior to eating). The use of Level D PPE, good hygiene, and following proper sampling procedures will minimize these potential exposures.

2.2.3 Field Measurements

Surface water samples will be analyzed at each sample collection location for the following field measurement parameters: pH, dissolved oxygen, conductivity (as specific conductance), turbidity, and temperature. The measurement procedures are described in the SOPs included in Appendix A-2. Field measurements will be taken at each location prior to sample collection laboratory analysis. All field instruments will be calibrated (according to the manufacturer's instructions) at the beginning of each date of sampling and checked at the end of each day. Field instrument calibration and sample measurement data will be recorded in the field logbook.

2.2.4 Field Variances

As conditions in the field vary, it may become necessary to implement minor modifications to the sampling procedures and protocols described in this QA Project Plan. If/when this is necessary, the Eagle Valley Band Field Sampler will notify the Eagle Valley Band Project Manager/QA Officer of the situation to obtain a verbal approval prior to implementing any changes. The approval will be recorded in the field logbook. Modifications will be documented in the Quarterly Reports to the US EPA Grants Project Officer.

2.2.5 Decontamination Procedures

For the currently planned sample collection activities, samples will be collected directly into sample bottles/containers provided from the laboratory. As such, no field decontamination of these bottles (used as the sampling equipment) is necessary. The bottles will be provided and certified clean by the laboratory according to procedures described in the laboratory's QA Manual provided in Appendix B.

In the case that there is a need to collect surface water samples by one of the alternative methods (as discussed in the sampling SOP provided in Appendix A-2), decontamination of reusable sampling equipment coming in direct contact with the samples will be necessary. Decontamination will occur prior to each use of a piece of equipment and after use at each sampling location. Disposable equipment (intended for one-time use) will not be decontaminated but will be packaged for appropriate disposal.
All reusable/non-disposable sampling devices will be decontaminated according to US EPA Region 9 recommended procedures using the following washing fluids in sequence:

- **Non-phosphate detergent and tap water wash (using a brush, if necessary),**
- **Tap-water rinse, and**
- **Deionized/distilled water rinse (twice).**

Equipment will be decontaminated in a predesignated area on plastic sheeting. Cleaned small equipment will be stored in plastic bags. Materials to be stored more than a few hours will also be covered.

2.2.6 Disposal of Residual Materials

In the process of collecting water samples for this project, various types of potentially contaminated wastes will be generated which may include the following:

- **Used PPE,**
- **Disposable sampling bottles/containers or equipment,**
- **Decontamination fluids, and**
- **Excess water collected for sample container filling.**

The USEPA's National Contingency Plan requires that management of the wastes generated during sampling comply with all applicable or relevant and appropriate requirements to the extent practicable. (Note: Although the National Contingency Plan does not strictly apply on tribal land, the Eagle Valley Tribe feels that its requirements are reasonable and has adopted its policies.) Residuals generated for this project will be handled in a manner consistent with the *Office of Emergency and Remedial Response (OERR) Directive 9345.3-02* (May 1991), which provides the guidance for the management of wastes. In addition, other legal and practical considerations that may affect the handling of the wastes will be considered, as follows:

- **Used personal protective equipment (PPE) and disposable containers/equipment will be double bagged and placed in a municipal refuse dumpster. These wastes are not considered hazardous and can be sent to a municipal landfill. Any used PPE and disposable containers or equipment (even if it appears to be reusable) will be rendered inoperable before disposal in the refuse dumpster.**
- **Decontamination fluids generated in the sampling event could consist of deionized water, residual contaminants, and water with non-phosphate detergent. The volume and concentration of the decontamination fluid will**

be sufficiently low to allow disposal at the sampling area. The water (and water with detergent) will be poured onto the ground.

- **Excess water collected for sample container filling will be poured onto the ground.**

2.2.7 Quality Assurance for Sampling

Documentation of deviations from this QA Project Plan or applicable SOPs is the responsibility of the Eagle Valley Band QA Officer. Deviations noted during the field audit will be documented in the QA Audit Logbook, recorded in the Field Audit Reports, and discussed in the Quarterly Reports.

Additional deviations from the QA Project Plan and/or SOPs may be implemented as field variances or modifications, as discussed in Section 2.2.4. These deviations will be communicated to the Eagle Valley Band Project Manager/QA Officer by the Eagle Valley Band Water Quality Technician/Field Sampler for approval. The approval will be recorded in the field logbook, and the modifications will be documented in the Quarterly Reports.

2.3 Sample Handling and Custody

This section describes the sample handling and custody procedures from sample collection through transport and laboratory analysis. It also includes procedures for the ultimate disposal of the samples.

2.3.1 Sample Containers & Preservatives

The Eagle Valley Band Project Manager has worked directly with the Laboratory Project Manager to determine the number of sample containers, and associated sizes/volumes and materials, needed for this monitoring project. The containers will be provided pre-cleaned from the laboratory directly and require no washing or rinsing by the field samplers prior to sample collection.

Preservatives (i.e., nitric acid for metals analysis) will also be provided by the laboratory. Sample bottle will not be pre-preserved. Instead, the preservative will be added to the sample containers by the field team immediately following sample collection.

Container and preservative information will be documented in the field logbook.

2.3.2 Sample Packaging and Shipping

All sample containers will be placed in a sturdy shipping container (e.g., a steel-belted cooler). The following outlines the packaging procedures that will be followed for this project:

1. **Line the bottom of the cooler with a large trash bag to minimize leakage of water.**
2. **Place bubble wrap around the inside edge of the cooler to prevent breakage during shipment, and/or wrap bottles individually.**
3. **Seal the drain plug of the cooler with fiberglass tape to prevent potential leakage from the cooler (should sample bottles or bagged ice leak.)**
4. **Prepare bags of ice to be used to keep the samples cool during transport. Ice will be used. Pack the ice in doubled, zip-locked plastic bags.**
5. **Check the sample bottle screw caps for tightness and, if not full, mark the sample volume level of liquid samples on the outside of the sample bottles with indelible ink.**
6. **Secure sample bottle/container tops and place a custody seal over the container's top.**
7. **Ensure sample labels are affixed to each sample container and protected by a cover of clear tape.**
8. **Wrap all glass sample containers in bubble wrap to prevent breakage.**
9. **Seal all sample containers in heavy duty plastic zip-lock bags. Write the sample numbers on the outside of the plastic bags with indelible ink.**
10. **Place sample containers (wrapped and sealed) into the cooler. Place the bagged ice on top and around the samples to chill them to the correct temperature.**
11. **Fill the empty space in the cooler with bubble wrap, Styrofoam peanuts, or any other available inert material to prevent movement and breakage during shipment.**
12. **Enclose the appropriate chain-of-custody(s) in a zip-lock plastic bag and affix to the underside of the cooler lid.**
13. **Close the lid of the cooler. Tape the cooler shut with fiberglass strapping tape.**
14. **Affix custody seals across the openings of the cooler both front and back to ensure that samples are not tampered with during transport. Include sample packer's initials and date on the custody seals.**

Daily, the Eagle Valley Band Field Samplers will notify the Laboratory Project Manager of the sample shipment schedule (note: Friday shipments must be reported no later than noon). The laboratory will be provided with the following information:

- **Sampler's name,**
- **Name and location of the site or sampling area,**
- **Names of the tribe and project,**
- **Total number(s) and matrix of samples shipped to the laboratory,**
- **Carrier, air bill number(s), method of shipment (e.g., priority next day),**
- **Shipment date and when it should be received by the laboratory,**
- **Irregularities or anticipated problems associated with the samples, and**
- **Whether additional samples will be shipped or if this is the last shipment.**

2.3.3 Sample Custody

The field sampler is responsible for custody of the samples until they are delivered to the laboratory or picked up for shipping. (Note: As few people as possible will handle the samples to ensure sample custody.) Chain-of-custody forms must be completed in the field. Each time one person relinquishes control of the samples to another person, both individuals must complete the appropriate portions of the chain-of-custody form (see Appendix A-4) by filling in their signature as well as the appropriate date and time of the custody transfer.

During transport by a commercial carrier, the air bill will serve as the associated chain-of-custody. Once at the laboratory, the sample receipt coordinator will open the coolers and sign and date the chain-of-custody form. The laboratory personnel are then responsible for the care and custody of samples. The analytical laboratory will track sample custody through their facility using a separate sample tracking form, as discussed in the laboratory QA Manual included in Appendix B.

A sample is considered to be in one's custody if:

- **The sample is in the sampler's physical possession,**
- **The sample has been in the sampler's physical possession and is within sight of the sampler,**

- **The sample is in a designated, secure area, and/or**
- **The sample has been in the sampler's physical possession and is locked up.**

2.3.4 Sample Disposal

Following sample analysis, the laboratory will store the unused portions for 6 months. At that time, the laboratory will properly dispose of all the samples. Sample disposal procedures at the laboratory are discussed in the laboratory's QA Manual included in Appendix B.

2.4 Analytical Methods

The field measurement and off-site laboratory analytical methods are listed in Table 2-3 and discussed below.

2.4.1 Field Measurement Methods

See Section 2.2.3.

2.4.2 Laboratory Analyses Methods (Off-Site)

All samples will be analyzed at North Face Analytical Laboratory. Analyses will be performed following either EPA-approved methods or methods from *Standard Methods for the Examination of Water and Wastewater, 20th Edition,* as summarized in Table 2-3. SOPs for the analytical methods are included in Appendix C. The Laboratory QA/QC Officer must notify the Laboratory Project Manager if there is any knowledge of the SOPs not being followed.

The laboratory will summarize the data and associated QC results in a data report, and provide this report to the Eagle Valley Band Project Manager within 2 weeks of sample receipt. The content of the data report is described in Section 1.9.3. The Eagle Valley Band Project Manager/QA Officer will review the data reports and associated QC results to make decisions on data quality and usability in addressing ~~the~~ project objectives.

2.5 Quality Control Requirements

This section identifies the QC checks that are in place for the sample collection, field measurement, and laboratory analysis activities that will be used to access the quality of the data generated from this project.

2.5.1 Field Sampling Quality Control

Field sampling QC consists of collecting field QC samples to help evaluate conditions resulting from field activities. Field QC is intended to support a number of data quality goals:

- **Combined contamination from field sampling through sample receipt at the laboratory (to assess potential contamination from field sampling equipment, ambient conditions, sample containers, sample transport, and laboratory analysis) - assessed using field blanks;**
- **Sample shipment temperature (to ensure sample integrity and representativeness that the sample arriving at the laboratory has not degraded during transport) - assessed using temperature blanks; and**
- **Combined sampling and analysis technique variability, as well as sample heterogeneity - assessed using field duplicates.**

For the current project, the types and frequencies of field QC samples to be collected for each field measurement and off-site laboratory analysis are listed in Table 2-3. These include field blanks, temperature blanks (as included in a footnote to the table), and field duplicates.

<u>Field Blanks</u> - Field blanks will be collected to evaluate whether contaminants have been introduced into the samples during the sample collection due to exposure from ambient conditions or from the sample containers themselves. Field blank samples will be obtained by pouring deionized water into a sample container at the sampling location. Field blanks will not be collected if equipment blanks have been collected during the sampling event. If no equipment blanks are collected (and none are planned because samples will be collected directly into sample containers), one field blank will be collected for every 10 samples or a frequency of 10%.

Field blanks will be preserved, packaged, and sealed in the same manner described for the surface water samples. A separate sample number and station number will be assigned to each blank. Field blanks will be submitted blind to the laboratory for analysis of metals, hardness, and anions. No field blanks are planned for the other analytical parameters or field measurements as it is not expected that it would yield information critical to project data needs.

If target analytes are found in field blanks, sampling and handling procedures will be reevaluated and corrective actions taken. These may consist of, but are not limited to, obtaining sampling containers from new sources, training of personnel, discussions with the laboratory, invalidation of results, greater attention to detail during the next sampling event, or other procedures felt appropriate.

<u>Temperature Blanks</u> - For each cooler of samples that is transported to the analytical laboratory, a 40-ml VOA vial (prepared by the laboratory) will be included that is marked "temperature blank." This blank will be used by the laboratory's sample custodian to check the temperature of samples upon receipt to ensure that samples were maintained at the temperature appropriate for the particular analysis.

For the current project, temperature blanks will be included in all coolers containing samples requiring temperature preservation, as identified in Table 2-3.

<u>Field Duplicate Samples</u> - Field duplicate samples will be collected to evaluate the precision of sample collection through analysis. Field duplicates will be collected at designated sample locations by alternately filling two distinct sample containers for each analysis. Field duplicate samples will be preserved, packaged, and sealed in the same manner described for the surface water samples. A separate sample number and station number will be assigned to each duplicate. The samples will be submitted as "blind" (i.e., not identified as field duplicates) samples to the laboratory for analysis.

For the current project, field duplicates will be collected for each analytical parameter, and field measurement parameter, at the frequencies shown in Table 2-2. The duplicates samples will be collected at random locations for each sampling event. Criteria for field duplicates for the analytical and field measurement parameters are provided in Tables 2-4A through 2-4E and Table 2-5, respectively. If criteria are exceeded, field sampling and handling procedures will be evaluated, and problems corrected through greater attention

to detail, additional training, revised sampling techniques, or whatever appears to be appropriate to correct the problems.

2.5.2 Field Measurement Quality Control

Quality control requirements for field measurements are provided in Table 2-5.

2.5.3 Laboratory Analyses Quality Control (Off-Site)

Laboratory QC is the responsibility of the personnel and QA/QC department of the contracted analytical laboratory. The laboratory's Quality Assurance Manual detail the QA/QC procedures it follows. The following elements are part of standard laboratory quality control practices:

- **Analysis of method blanks,**
- **Analysis of laboratory control samples,**
- **Instrument calibration (including initial calibration, calibration blanks, and calibration verification),**
- **Analysis of matrix spikes, and**
- **Analysis of duplicates.**

The data quality objectives for North Face Analytical Laboratory (including frequency, QC acceptance limits, and corrective actions if the acceptance limits are exceeded) are detailed in its QA Manual (as in Appendix B) and SOPs (as in Appendix C) or in this QA Project Plan. Any excursions from these objectives must be documented by the laboratory and reported to the Eagle Valley Band Project Manager/QA Officer.

The tribe has reviewed the laboratory's control limits and corrective action procedures and feels that these will satisfactorily meet tribal project data quality needs. A summary of this information is included in Tables 2-4A through 2-4E. These include laboratory (or method) blanks, laboratory control samples, matrix spikes, and laboratory duplicates.

<u>Method Blanks</u> - A method blank is an analyte-free matrix, analyzed as a normal sample by the laboratory using normal sample preparation and analytical procedures. A method blank is used for monitoring and documenting background contamination in the analytical environment. Method blanks will be analyzed at a frequency of one per sample batch (or group of up to 20 samples analyzed in sequence using the same method).

Corrective actions associated with exceeding acceptable method blank concentrations (as depicted in Tables 2-4A through 2-4E) include isolating the source of contamination and re-digesting and/or re-analyzing the associated samples. Sample results will not be corrected for blank contamination, as this is not required by the specific analytical methods. Corrective actions will be documented in the laboratory report's narrative statement.

Laboratory Control Samples - Laboratory control samples (LCS) are laboratory-generated samples analyzed as a normal sample and by the laboratory using normal sample preparation and analytical procedures. An LCS is used to monitor the day-to-day performance (accuracy) of routine analytical methods. An LCS is an aliquot of clean water spiked with the analytes of known concentrations corresponding to the analytical method. LCS are used to verify that the laboratory can perform the analysis on a clean matrix within QC acceptance limits. Results are expressed as percent recovery of the known amount of the spiked analytical parameter.

One LCS is analyzed per sample batch. Acceptance criteria (control limits) for the LCS are defined by the laboratory and summarized in Tables 2-4A through 2-4E. In general, the LCS acceptance criteria recovery range is 70 to 130 percent of the known amount of the spiked analytical parameter. Corrective action, consisting of a rerunning of all samples in the affected batch, will be performed if LCS recoveries fall outside of control limits. Such problems will be documented in the laboratory report's narrative statement.

Matrix Spikes - Matrix spikes (MS) are prepared by adding a known amount of the analyte of interest to a sample. MS are used as a similar function as the LCS, except that the sample matrix is a real-time sample rather than a clean matrix. Results are expressed as percent recovery of the known amount of the spiked analytical parameter. Matrix spikes are used to verify that the laboratory can determine if the matrix is causing either a positive or negative influence on sample results.

One matrix spike is analyzed per sample batch. Acceptance criteria are the MS are defined by the laboratory and summarized in Tables 2-4A through 2-4E. In general, the MS acceptance criteria recovery range is of 70 to 130 percent of the known amount of the spiked analytical parameter. Generally, no corrective action is taken for matrix spike results exceeding the control limits, as long as the LCS recoveries are acceptable. However, the matrix effect will be noted in laboratory report's narrative statement and documented in the tribe's reports for each sampling event.

Laboratory Duplicates - A laboratory duplicate is a laboratory-generated split sample used to document the precision of the analytical method. Results are expressed as relative percent difference between the laboratory duplicate pair.

One laboratory duplicate will be run for each laboratory batch or every 20 samples, whichever is more frequent. Acceptance criteria (control limits) for laboratory duplicates are specified in the laboratory QA Manual and SOPs and are summarized in Tables 2-4A through 2-4E. If laboratory duplicates exceed criteria, the corrective action will be to repeat the analyses . If results remain unacceptable, the batch will be rerun. The discrepancy will be noted in the laboratory report's narrative statement and documented in the tribe's reports for each sampling event.

2.5.4 Background Samples

Background samples are collected because there is a possibility that there are native or ambient levels of one or more target analytes present, and because one objective of the sampling event is to differentiate between on-site and off-site contributions to a parameter's concentration. The background location for this monitoring program will be the most upstream (and thus assumed to be least impacted) sample collected at location Upstream/SW-1. The analyses to be conducted on the background samples will be the same as that for the other surface water samples.

2.6 Instrument/Equipment Testing, Inspection, and Maintenance

2.6.1 Field Measurement Instruments/Equipment

Sampling equipment under the care of the Eagle Valley Environmental Program will be maintained according to the manufacturer's instructions. Maintenance logs will be kept in the office of the Eagle Valley Band Project Manager/QA Officer. Each piece of equipment will have its own maintenance log. The log will document any maintenance and service of the equipment. A log entry will include the following information:

- **Name of person maintaining the instrument/equipment,**
- **Date and description of the maintenance procedure,**
- **Date and description of any instrument/equipment problem(s),**
- **Date and description of action to correct problem(s),**
- **List of follow-up activities after maintenance (i.e., system checks), and**

- **Date the next maintenance will be needed.**

2.6.2 Laboratory Analysis Instruments/Equipment (Off-Site)

Inspection and maintenance of laboratory equipment is the responsibility of the North Face Environmental Laboratory and is described in the laboratory's QA Manual included as Appendix B.

2.7 Instrument/Equipment Calibration and Frequency

2.7.1 Field Measurement Instrument/Equipment

Calibration and maintenance of field equipment/instruments will be performed according to the associated SOP (see Appendix A-2) and recorded in an instrument/equipment logbook. Each piece of equipment/instrument will have its own logbook.

The project-specific criteria for calibration (frequency, acceptance criteria, and corrective actions associated with exceeding the acceptance criteria) are provided in Table 2-6.

2.7.2 Laboratory Analysis Instruments/Equipment

Laboratory instruments will be calibrated according to the appropriate analytical methods. Acceptance criteria for calibrations are found North Face Analytical Laboratory's calibrations procedures are contained in their QA Manual included as Appendix B.

2.8 Inspection and Acceptance of Supplies and Consumables

2.8.1 Field Sampling Supplies and Consumables

Sample containers and preservatives will be provided by the analytical laboratory. Containers will be inspected for breakage and proper sealing of caps. Other equipment such as sample coolers and safety equipment will be acquired by the tribe. If reusable sampling equipment is acquired in the future, materials/supplies necessary for equipment decontamination will be purchased by the tribe; however, this is not necessary for the present study. Any equipment deemed to be in unacceptable condition will be replaced.

2.8.2 Field Measurement Supplies and Consumables

Field measurement supplies, such as calibration solutions, will be acquired from standard sources, such as the instrument manufacturer or reputable suppliers. Chemical supplies will be American Chemical Society reagent grade or higher. The lot number and expiration date on standards and reagents will be checked prior to use. Expired solutions will be discarded and replaced. The source, lot number, and expiration dates of all standards and reagents will be recorded in the field log books.

2.8.3 Laboratory Analyses (Off-Site) Supplies and Consumables

The laboratory's requirements for supplies and consumables are described in its QA Manual which is provided in Attachment B.

2.9 Data Acquisition Requirements (Non-Direct Measurements)

To supplement field measurements and laboratory analytical activities conducted under this project, other potential "external" data sources will be researched. These sources include, but are not limited to, the U.S. Geological Survey, the California Department of Water Resources, the U.S. Environmental Protection Agency, and the Bureau of Reclamation. The primary use of this external data will be to help focus the tribe's data collection efforts (for example, the information may be used to identify new sites in the Shadow Valley River watershed for future sampling).

If it appears that the "external" data might facilitate water body evaluation, the data will first be reviewed to verify that they are of sufficient quality to meet the needs of the project by examining: (1) the sample collection and location information; (2) the data to see whether they are consistent with known tribally-collected data from the same general vicinity; and (3) the QA/QC information associated with the data. If the data are of insufficient or unknown quality, limitations will be placed on its use in supporting project decisions. In general, it is anticipated that decisions for the current project will be based on data collected by the tribe following this current QA Project Plan.

2.10 Data Management

All data collected by the Eagle Valley Environmental Program will be maintained in appropriate bound notebooks and electronic databases. Data from the laboratory will be

requested in both hard copy and electronic form. The electronic and hard copy results will be compared to ensure that no errors occurred in either format. If discrepancies are noted, the laboratory will be contacted to resolve the issues.

3.0 ASSESSMENT AND OVERSIGHT

This section describes how activities will be checked to ensure that they are completed correctly and according to procedures outlined in this QA Project Plan.

3.1 Assessment/Oversight and Response Actions

During the course of the project, it is important to assess the project's activities to ensure that the QA Project Plan is being implemented as planned. This helps to ensure that everything is on track and serves to minimize learning about critical deviations toward the end of the project when it may be too late to remedy the situation. For the current project, the ongoing assessments will include:

Field Oversight -

- **Readiness review of the field team prior to starting field efforts,**
- **Field activity audits, and**
- **Review of field sampling and measurement activities methodologies and documentation at the end of each event, and**

Laboratory Oversight -

- **Evaluation of laboratory data generated for each quarterly sampling event.**

Details regarding these assessments are included below.

3.1.1 Field Oversight

3.1.1.1 Readiness Reviews

Sampling personnel will be properly trained by qualified personnel before any sampling begins and will be given a brief review of sampling procedures and equipment operation by the Eagle Valley Band Project Manager/QA Officer before each sampling event. Equipment maintenance records will be checked to ensure all field instruments are in proper working order. Adequate supplies of all preservatives and bottles will be obtained and stored appropriately before heading to the field. Sampling devices will be checked to ensure that they have been properly cleaned (for devices which might be reused) or are available in sufficient quantity (for devices which are disposable). Proper paperwork, logbooks, chain of custody forms, etc. will be assembled by the sampling technician. The Eagle Valley Band Project Manager/QA Officer will review all field equipment, instruments, containers, and paperwork to ensure that all is in readiness prior to the first day of each sampling event. Any problems that are noted will be corrected before the sampling team is permitted to depart the tribe's facilities.

3.1.1.2 Field Activity Audits

During at least two of the quarterly sampling events, the Eagle Valley Band Project Manager/QA Officer will assess the sample collection methodologies, field measurement procedures, and record keeping of the field team to ensure activities are being conducted as planned (and as documented in this QA Project Plan). Any deviations that are noted will be corrected immediately to ensure all subsequent samples and field measurements collected are valid. (Note: If the deviations are associated with technical changes and/or improvements made to the procedures, the Eagle Valley Band QA Officer will verify that the changes have been documented by the Eagle Valley Band Water Quality Technician/Field Sampler in the Field Log Book and addressed in an amendment to this QA Project Plan.) The Eagle Valley Band QA Officer may stop any sampling activity that could potentially compromise data quality.

The Eagle Valley Band QA Officer will document any noted issues or concerns in a QA Audit Logbook and discuss these items informally and openly with the Eagle Valley Band Water Quality Technician/Field Sampler while on site. Once back in

the office, she will formalize the audit findings (for each event) in a Field Audit Report which will be submitted to the Eagle Valley Environmental Resources Program Director and the Eagle Valley Band Water Quality Technician/Field Sampler.

The Eagle Valley Band Water Quality Technician/Field Sampler will prepare a Corrective Action Report to address any audit findings discussed in the Field Audit Report. The Corrective Action Report will be issued as an internal memorandum the Eagle Valley Environmental Resources Program Director and the Eagle Valley Band Project Manager/QA Officer in response to problems noted during on-site audits and will document steps taken to reduce future problems prior to the next sampling event.

3.1.1.3 Post Sampling Event Review

Following each sampling event, the Eagle Valley Water Quality Technician/Field Sampler will complete the Field Activities Review Checklist (Figure 3-1). This review of field sampling and field measurement documentation will help ensure that all information is complete and any deviations from planned methodologies are documented. This review will be conducted in the office, not in the field. (Note: This function is typically performed by a third party not directly involved in the activities. However, due to the small size of the staff, the field technician will attempt to "wear a new hat" and self-evaluate his activities.) The results of this review, as well as comments associated with potential impacts on field samples and field measurement integrity will be forwarded to the Eagle Valley Project Manager to be used in preparing the reports for each event and also to be used as a guide to identify areas requiring improvement prior to the next sampling event.

3.1.2 Laboratory Oversight

Following receipt of the off-site laboratory's data package for each sampling event, the Eagle Valley Band QA Officer will review the data package for completeness, as well as to ensure that all planned methodologies were followed and that QA/QC objectives were met. The results of the review will be documented on the Laboratory Data Review Checklist (Figure 3-2). (Note: The Eagle Valley Band Project Manager/QA Officer has the authority to request re-testing or other corrective measures if the laboratory has not met the project's QA/QC objectives and/or has not provided a complete data package.)

Due to the scope and objectives of the current project, the tribe is not planning any laboratory audits at this time. However, the tribe will check periodically with the state of California certification agency to make sure that the laboratory remains in good standing for those methods that the tribe is requesting.

The laboratory's QA Manual describes the policies and procedures for assessment and response in the laboratory. North Face Analytical Laboratory's QA Manual is included as Appendix B.

3.2 Reports to Management

Once each quarter, the Eagle Valley Band Project Manager will prepare and submit a report on that quarter's sampling activities. Contents of this report have been described previously in Section 1.9.5. This report will be submitted to the tribal council for approval. After approval, the report will be submitted to the US EPA Grants Project Officer.

Once a year a report summarizing the year's reports will be prepared which will show any data trends that have occurred. The report will also discuss how any actions taken during the year may have affected the trends. This report will also be submitted to the tribal council for approval. After approval, the report will be submitted to the US EPA Grants Project Officer.

Additional (less formal) internal reports are described in Sections 1.9.2 through 1.9.4.

4.0 DATA REVIEW AND USABILITY

Prior to utilizing data to make project decisions, the quality of the data needs to be reviewed and evaluated to determine whether the data satisfy the project's objectives. This process involves technical evaluation of the off-site laboratory data, as well as review of the data in conjunction with the information collected during the field sampling and field measurement activities. This latter, more qualitative review provides for a clearer understanding of the overall usability of the projects's data and potential limitations on their use. This section describes the criteria and procedures for conducting these reviews and interpreting the project's data.

4.1 Data Review, Verification, and Validation Requirements

Setting data review, verification, and validation requirements helps to ensure that project data are evaluated in an objective and consistent manner. For the current project, such requirements have been defined for information gathered and documented as part of field sampling and field measurement activities, as well as for data generated by the off-site laboratory.

4.1.1 Field Sampling and Measurement Data

Any information collected during sample collection and field measurements is considered field "data." This includes field sampling and measurement information documented in field logbooks (as listed in Section 1.9.2.1), photographs, and chain of custody forms.

Once the Eagle Valley Band Water Quality Technician/Field Sampler returns to the office following a quarterly field event, he is responsible for conducting a technical review of the field data to ensure that all information is complete and any deviations from the planned methodologies are documented. (Note: This function is typically performed by a third party not directly involved in the activities. However, due to the small size of the staff, the field technician will attempt to self-evaluate his activities.) For the purpose of this project, the review will be documented using the Field Activities Review Checklist provided in Figure 3-1. This checklist comprehensively covers the items to be reviewed and leaves room to capture any comments associated with potential impacts on field samples and field measurement integrity based on the items listed.

4.1.2 Laboratory Data

For the data generated by the off-site laboratory (North Face Analytical Laboratory), the laboratory is responsible for its own internal data review and verification prior to submitting the associated data results package to the Eagle Valley Band QA Officer. The details of the review (including checking calculations, reviewing for transcription errors, ensuring the data package is complete, etc.) are discussed in the laboratory's QA Manual included as Appendix B. Details of the information that will be included in each data package is listed in Section 1.9.3 of this QA Project Plan.

Once the laboratory data are received by the tribe, the Eagle Valley Band QA Officer is responsible for further review and validation of each data package. For the purpose of

this project, data review and validation will be conducted using the Data Review Checklist provided in Figure 3-2 in conjunction with the QC criteria (i.e., frequency, acceptance limits, and corrective actions) defined in Tables 2-4A through 2-4E. This review will include evaluation of the field and laboratory duplicate results, field and laboratory blank data, matrix spike recovery data, and laboratory control sample data pertinent to each analysis. The review will also include ensuring data are reported in compliance with the project action limits and quantitation limits defined in Table 1-1; the sample preparation/analytical procedures were performed by the methods listed in Table 2-3; sample container, preservation, and holding times met the requirements listed in Table 2-3; the integrity of the sample (ensuring proper chain of custody and correct sample storage temperatures) is documented from sample collection through shipment and ultimate analysis, and the data packages. The Data Review Checklist comprehensively covers the review of all these items. (Note: Calibration data will not be requested for the project at this time.)

The Eagle Valley Band QA Officer will further evaluate each data package's narrative report and summary tables to see whether the laboratory "flagged" any sample results based on poor or questionable data quality and to ensure that any exceedances of the laboratory's QC criteria (as listed in Tables 2-4A through 2-4E) are documented. If a problem was noted by the laboratory, the Eagle Valley Band QA Officer will evaluate whether the appropriate prescribed corrective action was taken by the laboratory, the action successfully resolved the problem, and the process and its resolution were accurately documented.

An effort will be made to identify whether any data quality problem is the result of laboratory issues and/or if it may be traced to some field sampling activity. If the laboratory is determined to be responsible, the Eagle Valley Band QA Officer will request information from the laboratory documenting that the problem has been resolved prior to submitting future samples. If some aspect of the field operation (e.g., sample collection, sample containers and/or preservation, chain-of-custody, sample shipment, paperwork, etc.) is identified as the possible problem, efforts will be made to retrain the tribe's field staff to minimize the potential of the problem recurring. If the problem is believed to be due to the sample matrix, the Eagle Valley Band Project Manager/QA Officer will discuss the use of alternative analytical methods with the laboratory; and, if an alternative method is available that might minimize the problem, the QA Project Plan will be modified and/or amended accordingly.

If any of the QC criteria and/or the project requirements (as discussed above) are exceeded, the associated data will be qualified as estimated and flagged with a "J". If grossly exceeded, the associated data will be rejected and the need for resampling will be considered. However, since the data are being generated for a baseline assessment, it is generally felt that paying special attention to some troublesome sample collection or analytical concern during the next sampling event will be sufficient and re-sampling will not be necessary.

4.2 Verification and Validation Methods

Defining the data verification and validation methods helps to ensure that project data are evaluated in an objective and consistent manner. For the current project, such methods have been described for information gathered and documented as part of the field sampling and field measurement activities, as well as the data generated by the off-site laboratory.

4.2.1 Field Sampling and Measurement Data

The methods associated with verification and validation of the field sampling and measurement data are included within the discussion provided in Section 4.1.1.

4.2.2 Laboratory Data

The methods associated with verification and validation of the laboratory data are included within the discussion provided in Section 4.1.2.

4.3 Reconciliation with User Requirements

The purpose of the continued monitoring of the Shadow Valley River is to assess the Band's primary surface water resource and determine whether analytes of concern exceed national water quality standards. Data must fulfill the requirements of this QA Project Plan to be useful for the overall project. Information needed to support decision making under the surface water monitoring program is contained in this QA Project Plan, field documentation, the laboratory "data package" report, the Field Activities Review Checklist, the Laboratory Data Review Checklist, and the Field Audit Report and associated Corrective Action Report. This section describes the steps to be taken to

ensure data usability (after all the data have been assembled, reviewed, verified, and validated) prior to summarizing the information in the Quarterly and Annual Reports.

Once all the data from the field and laboratory have been evaluated (as described in Sections 4.1 and 4.2), the Eagle Valley Band Project Manager/QA Officer will make an overall assessment concerning the final usability of the data (and any limitations on its use) in meeting the project's needs. The initial steps of this assessment will include, but not necessarily be limited to:

- **Discussions with the Eagle Valley Band Water Quality Technician/Field Sampler,**
- **Review of deviations from the QA Project Plan or associated SOPs to determine whether these deviations may have impacted data quality (and determining whether any impacts are widespread or single incidents, related to a few random samples or a batch of samples, and/or affecting a single or multiple analyses),**
- **Evaluation of the field and laboratory results and QC information,**
- **Review of any other external information which might influence the results, such as off-reservation activities up stream, meteorological conditions (such as storm events proceeding sampling that might contribute to high turbidity readings), and data from other sources,**
- **Evaluation of whether the completeness goals defined in this QA Project Plan have been met,**
- **Examination of any assumptions made when the study was planned, if those assumptions were met, and, if not, how the project's conclusions are affected.**

After all this information has been reviewed, the Eagle Valley Band Project Manager/QA Officer will incorporate her perspective on the critical nature of any problems noted and, ultimately, identify data usability and/or limitations in supporting project objectives and decision making. All usable data will then be compared to the Project Action Limits (as listed in Table 1-1) to identify whether these limits have been exceeded. Decisions made regarding exceeding the Project Action Limits (i.e., the national water quality standards) will follow the "...if...then..." statements included in Section 1.7.1.

In addition, the Eagle Valley Band Project Manager/QA Officer will assess the effectiveness of the monitoring program and data collection at the end of each calendar

year. Sampling locations, frequency, list of analytical parameters, field measurement protocols, choice of the analytical laboratory, etc. will be modified as needed to reflect the changing needs and project objectives of the Eagle Valley Band of Indians. This QA Project Plan will be revised and/or amended accordingly.

5.0 REFERENCES

U.S. Environmental Protection Agency, 1991. *Office of Emergency and Remedial Response (OERR) Directive 9345.302*, May.

U.S. Environmental Protection Agency, 2000. *EPA Guidance for the Data Quality Objectives Process*, EPA QA/G-4, EPA/600/R-96/005, August.

U.S. Environmental Protection Agency, 2001. *EPA Requirements for Quality Assurance Project Plans*, EPA QA/R-5, EPA/240/B-01/003, March.

U.S. Environmental Protection Agency, 2002, *EPA Guidance for Quality Assurance Project Plans*, EPA QA/G-5, EPA/240/R-02/009, December.

U.S. Environmental Protection Agency, 2002. *EPA Guidance on Choosing a Sampling Design for Environmental Data Collection for Use in Developing a Quality Assurance Project Plan*, QA/G-5sS, EPA/240/R-02/005, December.

U.S. Environmental Protection Agency, 2002. *Guidance on Environmental Data Verification and Data Validation*, EPA QA/G-8, EPA/240/R-02/004, November.

FIGURES

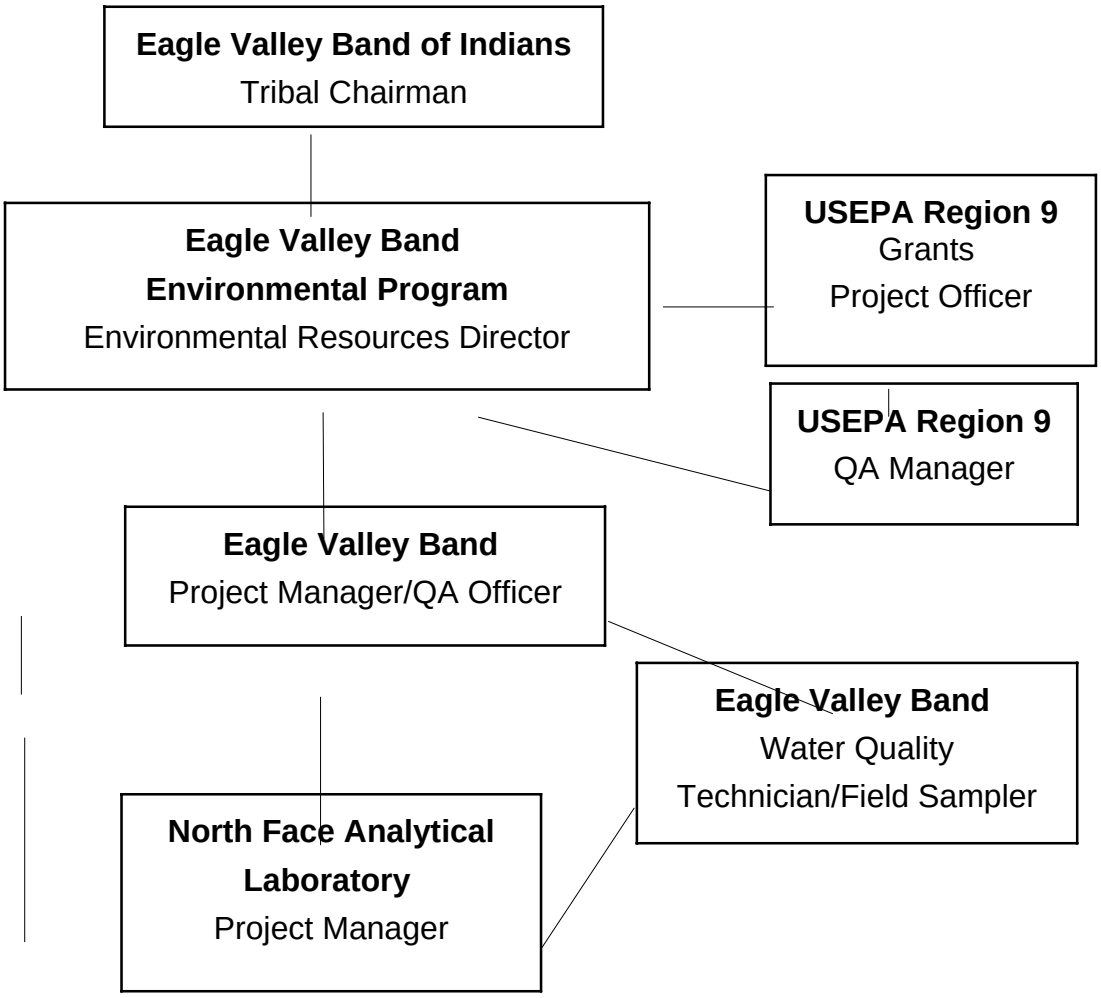

Figure 1-1. Project Organization Chart
Surface Water Monitoring Program
Eagle Valley Band of Indians
September 2005

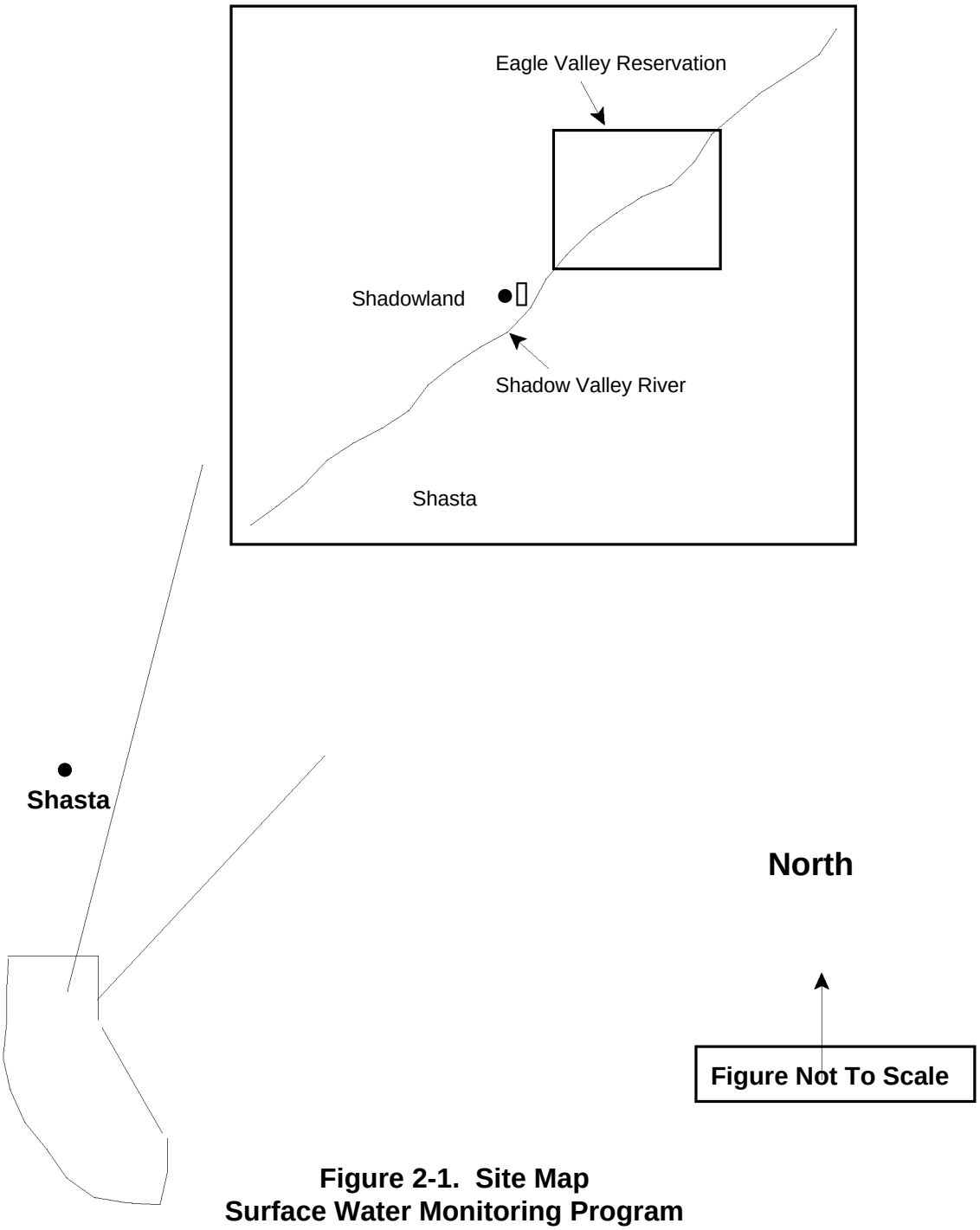

Figure 2-1. Site Map
Surface Water Monitoring Program
Eagle Valley Band of Indians
September 2005

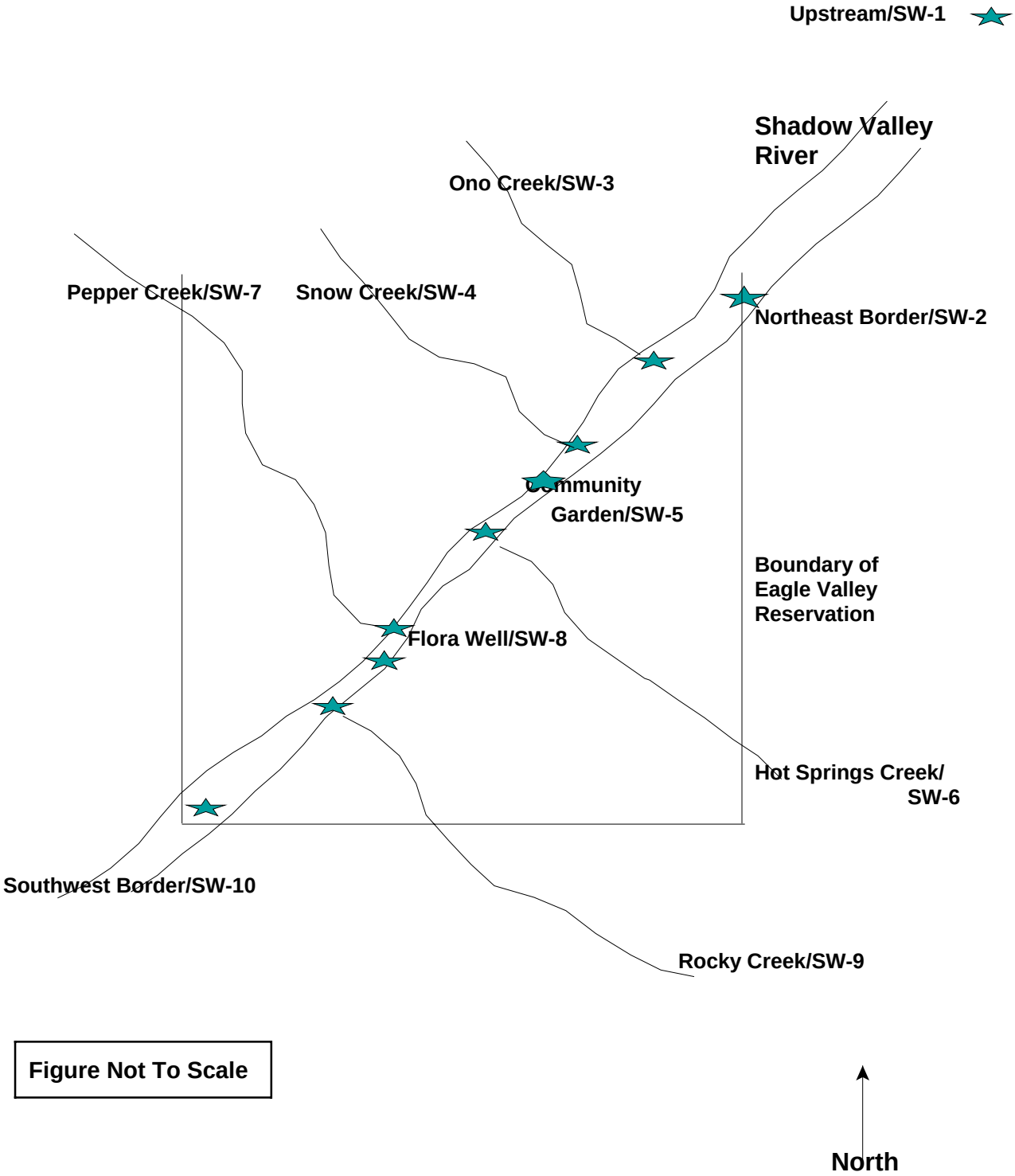

Figure 2-2. Sampling Locations
Surface Water Monitoring Program
Eagle Valley Band of Indians

Field Activities Review Checklist

Sampling Location(s):

_____

Date(s) of Sampling:

_____

Mark each topic "Yes," "No," or "NA" (not applicable), and comment as appropriate.

_____ **All required information was entered into field logbooks in ink, and logbook pages were signed & dated.**
Comment:

_____ **Deviations from SOPs , along with any pertinent verbal approval authorizations and dates, were documented in field logbooks.**
Comment:

_____ **Samples that may be affected by deviations from SOPs were flagged appropriately.**
Comment:

_____ **Field measurement calibration standards were not expired and were in the correct concentrations.**
Comment:

_____ **Field calibrations were performed and results were within QAPP-specified limits for all parameters (Temperature, pH, Dissolved Oxygen, Conductivity, and Turbidity).**
Comment:

_____ **Field measurement QC samples were within the QAPP-specified limits for all parameters.**
Comment:

_____ **Field measurement data were recorded in the appropriate logbooks(s).**
Comment:

_____ **Samples were collected at the correct sites.**
Comment:

_____ **The correct number of samples for each type of analysis and the correct volume was collected.**
Comment:

_____ **Certified clean sample containers, appropriate for the intended analysis, were used.**
Comment:

_____ **Requested/required field quality control (QC) samples (Field blanks and field duplicates) were collected, and at the correct frequency.**
Comment:

_____ **Samples were preserved with the correct chemicals, if required.**
Comment:

_____ **Samples were stored and/or shipped at the proper temperature.**
Comment:

_____ **Chain-of-custody documents were completed properly.**
Comment:

_____ **Custody seals were applied and intact when relinquishing custody of the samples.**
Comment:

_____ **Sample holding times were not exceeded during field operations.**
Comment:

Reviewer's Name (print):

_____

Reviewer's Signature: _____

Reviewer's Title:

_____

Address, Phone Number & Email:

_____

_

Date of Review: ___/___/_____

Figure 3-1. Field Activities Review Checklist
Surface Water Monitoring Program
Eagle Valley Band of Indians

Laboratory Data Review Checklist

Sampling Project:_____

Date of Sampling:_____

Analytical Laboratory:_____

Mark each topic "Yes," "No," or "NA" (not applicable), and comment as appropriate.

_____ **Final data package includes chain-of-custody forms.**
Comment:

_____ **Chain-of-custody forms were properly completed and signed by everyone involved in transporting the samples.**
Comment:

_____ **Laboratory records indicate sample custody seals were intact upon receipt.**
Comment:

_____ **Samples arrived at the laboratory at the proper temperature.**
Comment:

_____ **All requested analyses were performed and were documented in the analytical report.**
Comment:

_____ **Analyses were performed according to the methods specified in the approved QA Project Plan.**
Comment:

_____ **Holding times for extraction and analysis were not exceeded.**
Comment:

_____ **Method detection and/or quantitation limits were included in the report.**
Comment:

_____ **A Narrative summarizing the analyses and describing any analysis problems was included in the final report.**
Comment:

_____ **Data qualifiers and flags were explained in the analytical report.**
Comment:

_____ **Method (laboratory) blank results were included for all analyses, at the appropriate frequency, and showed no laboratory contamination.**
Comment:

_____ **Initial calibration data (if requested from the laboratory) were within QAPP, method, or laboratory SOP defined acceptance criteria for all analyses.**
Comment:

_____ **Continuing calibration data (if requested from the laboratory) were within QAPP, method, or laboratory SOP defined acceptance criteria for all analyses.**
Comment:

_____ **Matrix spike data were included for all pertinent analyses for every 20 samples.**
Comment:

_____ **Laboratory Control Sample data were included for all analyses for every 20 samples.**
Comment:

_____ **Laboratory Duplicate data were included for all analyses for every 20 samples.**
Comment:

_____ **Field blanks do not contain analytes of interest or interfering compounds and included for all pertinent analyses for every 20 samples.**
Comment:

_____ **Field Duplicates are within QAPP-defined acceptance criteria and included for all analyses for every 10 samples.**
Comment:

_____ **Matrix spike results were listed and within QAPP or laboratory defined acceptance criteria.**
Comment:

_____ **Matrix interferences were definitively identified either through a second analysis or use of Laboratory Control Sample Results.**
Comment:

_____ **Laboratory Control Sample results were within QAPP or laboratory defined acceptance criteria.**

Comment:

_____ **Laboratory Duplicate results were within QAPP or laboratory defined acceptance criteria.**
Comment:

_____ **Reported results were within method detection or quantitation limits.**
Comment:

Reviewer's Name (print):
_____

Reviewer's Signature: _____

Reviewer's Title:
_____

Address, Phone Number, and Email:
_____

Date of Data Review: __/___ /_____

Figure 3-2. Laboratory Data Review Checklist
Surface Water Monitoring Program
Eagle Valley Band of Indians

TABLES

Table 1-1. Analytical Parameters and Target Limits
Surface Water Monitoring Program

Analytical Parameter/ Field Measurement	Project Action Limit (mg/L)[1]	North Face Analytical Laboratory Limits (mg/L)[2]	
		Quantitation Limits	Detection Limits (if applicable)
ANALYSES:			
Metals:			
Aluminum	NRL[3]	0.2	0.0166
Antimony	0.014	0.002	0.0018
Arsenic	0.150	0.01	0.0033
Barium	NRL	0.01	0.0011
Cadmium	0.00025[4]	0.0022	0.0017
Calcium	NRL	5.0	0.0204
Chromium (total)	0.074	0.013	0.0022
Copper	0.009[4]	0.025	0.0026
Iron	NRL	0.1	0.0046
Lead	0.0025	0.001	0.00079
Magnesium	NRL	5.0	0.0157
Manganese	NRL	0.015	0.0008
Mercury	0.00077	0.0002	0.0002
Nickel	0.052	0.025	0.010
Selenium	0.005[4]	0.005	0.00166
Silver	0.0032[4]	0.01	0.0016
Zinc	0.120[4]	0.6	0.0036
Hardness[5]	NRL	NA[6]	NA

Table 1-1. (Continued) Analytical Parameters and Target Limits
Surface Water Monitoring Program

Analytical Parameter/ Field Measurement	Project Action Limit (mg/L)[1]	North Face Analytical Laboratory Limits (mg/L)[2]	
		Quantitation Limits	Detection Limits (if applicable)
Anions:			
Chloride, Cl^-	NRL	0.2	0.015
Nitrate, NO_3^- (as nitrogen)	NRL	0.2	0.004
Nitrite, NO_2^- (as nitrogen)	NRL	0.2	0.013
Phosphate, PO_4=	NRL	1.0	0.2
Sulfate, SO_4=	NRL	1.0	0.2
Total Dissolved Solids	NRL	NA	NA
Alkalinity	NRL	10.0	5.0
Total Coliform and E. Coli	<5.0 percent positive samples in a month; for water systems that collect <40 routine samples per month, no more than one sample can be positive for total coliform.	NA	NA
	Project Action Limit[1]	**Measurement Range[7]**	**Detection Limits**
FIELD MEASUREMENTS:			
Temperature	<18 °C	0 - 40 °C	NA
pH	6.5 - 8.5	4.0 - 10.0	NA
Dissolved Oxygen	>8.0 mg/L	0 - 14 mg/l	NA
Conductivity/Specific Conductance	NRL	100 - 500 uS/cm	NA
Turbidity	<10% above background NTU	0 - 20 NTU	NA

NOTES:
[1] **Values listed for the analytical parameters are the national water quality standards as identified in:** ***US EPA, EPA National Recommended Water Quality Criteria: 2002, EPA-822-R-02-047, Nov. 2002*****.**

Values listed for the field measurements are water quality standards as identified in: *EPA Water Quality Standards Handbook: Second Edition, EPA-823-B-94-005, August 1994; Appendix B: Water Quality Standards Regulations* for flowing water Class II/Excellent.

[2] All "ANALYSES" values are in mg/l and based on information provided by North Face Analytical Laboratory. All "FIELD MEASUREMENTS" values are in the units noted.

[3] NRL - No regulatory limit. Laboratory Quantitation Limit or Field Measurement Range is acceptable for this project.

[4] Project Action Limit is equal to or less than Laboratory Quantitation Limit. However, Laboratory Quantitation Limit is considered acceptable to support the current project objectives designed to help focus future monitoring events.

[5] Hardness is calculated from results of calcium and magnesium analyses determined from EPA Method 200.7. SM2340B provides the calculation.

[6] NA - Not applicable.

[7] Values indicate the measurement ranges of field instruments and bracket the project action limits. The ranges are supported by calibration procedures.

Table 2-1. Sampling Design and Rationale
Surface Water Monitoring Program

Sampling Location/ ID Number	Location	Rationale for Sampling Design[1]
Upstream SW-1	10 miles upstream from the northeastern border of the Eagle Valley Reservation	Background sample. Most upstream sampling location and in an undeveloped and uninhabited area.
Northeast Border SW-2	100 feet into the northeastern border of the Eagle Valley Reservation	Monitors water entering the Eagle Valley Reservation.
Ono Creek (mouth of) SW-3	At the confluence of Ono Creek and the Shadow Valley River	Project will collect samples at the confluences of all creeks to monitor quality of creek water entering the Shadow Valley River. Minor development along Ono Creek, including free-range grazing of cattle.
Snow Creek (mouth of) SW-4	At the confluence of Snow Creek and the Shadow Valley River	Monitors quality of creek water entering the Shadow Valley River. Minor development along Snow Creek.
Community Garden (adjacent to) SW-5	In the Shadow Valley River adjacent to the community garden	Largest (size and production-wise) community garden within the Reservation. The garden, which is non-organic, almost borders the Shadow Valley River. Surface runoff from the garden flows directly into the river.
Hot Springs Creek (mouth of) SW-6	At the confluence of Hot Springs Creek and the Shadow Valley River	Monitors quality of creek water entering the Shadow Valley River. Moderate development along Hot Springs Creek.
Pepper Creek (mouth of) SW-7	At the confluence of Pepper Creek and the Shadow Valley River	Monitors quality of creek water entering the Shadow Valley River. Most of the non-residential structures on the Reservation (e.g., tribal office, health clinic, and such) are along Pepper Creek.
Flora Well (near) SW-8	In the Shadow Valley River approximately 500 feet from the well on the Flora property	Just above the entry point to the Shadowland Community Services District's community water system.
Rocky Creek (mouth of) SW-9	At the confluence of Rocky Creek and the Shadow Valley River	Monitors quality of creek water entering the Shadow Valley River. Minor development along Rocky Creek.
Southwest Border SW-10	20 feet inside the southwestern border of the Eagle Valley Reservation	Monitors water leaving the Eagle Valley Reservation.

NOTES:[1] All samples will be surface water collected from 6-12" depth. If the water source is less than 12" deep, samples will be collected at mid depth and noted in the field logbook. All samples will be analyzed for the analytical parameters and field measurements listed in Table 1-1.

Table 2-2. Summary of Field and QC Samples To Be Collected
Surface Water Monitoring Program
Eagle Valley Band of Indians
September 2005

Matrix/ Media	Analytical Parameter[1]	No. of Sampling Locations[2]	Depth (surface, mid, or deep)[3]	No. of Field Duplicates[4]	Inorganic[5] No. of:		No. of Field Blanks[6]	Total No. of Samples[7]
					Dup	MS		
ANALYSES:								
Surface Water	Metals[A]	10	surface (grab)	1	NAS	1	1	13
Surface Water	Hardness[A]	10	surface (grab)	1	NAS	1	1	13
Surface Water	Anions[B]	10	surface (grab)	1	NAS	1	1	13
Surface Water	Total Dissolved Solids (TDS)[B]	10	surface (grab)	1	NAS	0	0	11
Surface Water	Alkalinity[B]	10	surface (grab)	1	NAS	0	0	11
Surface Water	Total Coliform[C]	10	surface (grab)	1	NAS	0	0	11
Surface Water	E. Coli[C]	10	surface (grab)	1	NAS	0	0	11
FIELD MEASUREMENTS:								
Surface Water	temperature, pH, dissolved oxygen, conductivity/ specific conductance	10	surface (grab)	2	0	0	0	12
Surface Water	turbidity	10	surface (grab)	2	0	0	0	12

NOTES:

[1] **All analyses will be performed at an off-site laboratory. There will be no field screening analyses. Field measurements will be performed at each sample collection location.**

Metals include: EPA Method 200.7 for Aluminum, Arsenic, Barium, Calcium, Chromium (total), Copper, Iron, Lead, Manganese, Magnesium, Nickel, Silver, & Zinc. EPA Method 200.8 for Antimony, Cadmium, and Selenium. EPA Method 245.1 for Mercury.

Anions include: Chloride, Nitrate, Nitrite, Phosphate, & Sulfate.

[2] **Samples include: 1 upstream and 9 on Reservation.**

[3] Samples will be collected at depth of 6-12 inches. If depth of water is less than 12 inches, sample will be collected at mid depth and noted in the field logbook.
[4] Sample collection is expected to take place during a 2-day period. Field duplicates will be collected at a frequency of 10% of the samples collected for laboratory analysis. Field duplicates will be collected at a frequency of 10% or one per day, whichever is more frequent, for samples collected for field measurements.
[5] Include number of associated analytical QC samples if collection of additional sample volume and/or bottles is necessary. If the QC samples listed are part of the analysis but no additional sample volume and/or bottles are needed, include "NAS" (for "no additional sample") in the column. (Note: MS=matrix spike, MSD=matrix spike duplicate, dup=laboratory duplicate/replicate.)
[6] Field blanks will be collected at a frequency of 10% of the of samples collected, or one per day, whichever is less frequent. Field blanks will not be collected, as they were determined not to be critical, to support laboratory analysis of Total Dissolved Solids, alkalinity, total coliform, e. coli or for field measurements.
[7] Temperature blank samples will be submitted with each cooler of samples. These samples were not included in the sample count, as they are not carried though the analyses.

[A] Samples for analysis of metals and hardness are collected in the same sample container.
[B] Samples for analysis of anions, Total Dissolved Solids, and alkalinity are collected in the same sample container.
[C] Samples for analysis of total coliform and e. coli are collected in the same sample container.

Table 2-3. Field Measurement and Analytical Methods, Containers, Preservation & Holding Time Requirements Surface Water Monitoring Program

Analytical Parameter	Analytical Method Number[1]	Containers (number, size/volume, type)	Preservation Requirements (chemical, temperature, light protection)	Maximum Holding Times[2]
ANALYSES:				
Aluminum, Arsenic, Barium, Calcium, Chromium (total), Copper, Iron, Lead, Manganese, Magnesium, Silver, and Zinc	EPA 200.7	1 x 1 liter polyethylene bottle	HNO_3 to pH < 2	6 months
Antimony, Cadmium, and Selenium	EPA 200.8			
Mercury	EPA 245.1			28 days
Hardness	SM 2340B[3]	N/A[3, 5]	N/A[3, 5]	N/A[3, 5]
Anions (Cl, NO_3, NO_2, PO_4, SO_4)	EPA 300.0	1 x 1 liter polyethylene bottle	Chill to 4°C	48 hours[4]
Total Dissolved Solids (TDS)	EPA 160.1			7 days
Alkalinity	SM 2320B			14 days
Total Coliform / E. Coli	SM 9222	1 x 500 ml polyethylene bottle, sterilized	Chill to 4°C	6 hours (collection to lab receipt); 2 hours (lab receipt to analysis)
FIELD MEASUREMENTS:				
Temperature, pH, Dissolved Oxygen, Conductivity/Specific Conductance	see SOP[6] in Appendix A-2	1 x 250 ml mid-mouth glass bottle	none	immediate
Turbidity	see SOP[7] in Appendix A-2	1 x 250 ml mid-mouth glass bottle	none	immediate

NOTES: ALL SAMPLES ARE SURFACE WATER MATRIX.

[1] SOPs are based on information presented in the analytical methods listed that are referenced from:

EPA (various)
- 160.1 - Methods for Chemical Analysis of Water & Wastes, EPA/600/4-79-020, Revised March 1983.
- 200 Series - Methods for the Determination of Metals in Environmental Samples - Supplement I, EPA/600/R-94/111, May 1994.
- 300.0 - Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93/100, August 1993.

SM Standard Methods for the Examination of Water & Wastewater, 20th Edition, 1998

(NOTE: Information regarding containers, preservation, and holding time requirements for the various analytical methods are referenced from: 40 CFR Part 136.3, Table II on page 34.)

[2] All holding times are based on time from sample collection to analysis.

[3] Hardness is calculated from results of calcium and magnesium analyses determined from EPA 200.7. SM2340B provides the calculation.

[4] Holding time is based on analysis of nitrite and nitrate. Holding times for analysis of chloride and sulfate are 28 days.

[5] N/A - Not applicable. No separate sample collected.

[6] SOPs are based on SM 2550B, SM 4500-H^+ B, SM 4500-O G, & SM 2510 B, respectively.

[7] SOP is based on SM 2130.

Table 2-4A. Quality Control Requirements for Laboratory Analyses (Surface Water for Analyses of Metals and Hardness) Surface Water Monitoring Program

Analytical Method/SOP: EPA Method 200.7, 200.8, & 245.1; SM2340B

QC Sample:	Data Quality Indicator (DQI)[1]	Frequency/ Number	Method/SOP QC Acceptance Limits[2]	Acceptance Criteria/ Measurement Performance Criteria[3]	Corrective Action
FIELD:					
Field Duplicate	Precision (S & A)	1/10 field samples	NA	RPD </= 20% for concentrations >5 x QL	Qualify associated field data and/or resample.
Field Blank	Accuracy/ Bias as Contamination (S & A)	1/20 field samples	NA	concentration <QL	Qualify associated field data and/or resample.
ANALYSIS:					
Laboratory Duplicate	Precision (A)	1/ batch of up to 20 samples	RPD </= 20% for concentrations >5 x QL	RPD </= 20% for concentrations >5 x QL	Review with lab manager. Reanalyze or justify in data report.
Laboratory Blank	Accuracy/ Bias as Contamination (A)	1/ batch of up to 20 samples	concentration <½ QL or associated sample concentration >10x blank value	concentration <½ QL or associated sample concentration >10x blank value	Reprep and reanalyze. If problem recurs, reprep and reanalyze blank and all associated samples.
Matrix Spike	Accuracy/ Bias as Recovery (S & A)	1/batch of up to 20 samples	70-130% recovery of true value	70-130% recovery of true value	Reprep and reanalyze. If problem recurs, justify in data report.
Laboratory Control Sample	Accuracy/ Bias as Recovery (A)	1/batch of up to 20 samples	70-130% recovery of true value	70-130% recovery of true value	Review with lab manager. Reanalyze or justify in data report.

NOTES:

[1] Data Quality Indicators may be related to sampling (S) and/or analysis (A) activities.

[2] For field QC samples, there are no method-specific QC acceptance limits. (NA - Not applicable.) For hardness, there are no method-specific QC. Hardness is calculated from the calcium and magnesium concentrations determined from EPA Method 200.7 which covers the QC criteria.

[3] The information in this column supports acceptance criteria/measurement performance criteria introduced in Section 1.7.3. For this study, the laboratory's QC acceptance limits were reviewed and found acceptable to meet the current data quality needs. As such, the laboratory's QC acceptance limits and the project's measurement performance criteria are equivalent.

ALL SAMPLES ARE SURFACE WATER MATRIX. ALL SAMPLES ARE COLLECTED BY THE SAME PROCEDURE, AS PRESENTED IN APPENDIX A.

METALS analyses include those analyses listed in Tables 1-1 & 2-3.

HARDNESS is calculated from the calcium and magnesium concentrations determined from EPA Method 200.7. Therefore, the associated QC criteria is covered under that analytical method.

Table 2-4B. Quality Control Requirements for Laboratory Analyses (Surface Water Analyses of Anions) Surface Water Monitoring Program

Analytical Method/SOP: EPA Method 300.0

QC Sample:	Data Quality Indicator (DQI)[1]	Frequency/ Number	Method/SOP QC Acceptance Limits[2]	Acceptance Criteria/ Measurement Performance Criteria[3]	Corrective Action
FIELD:					
Field Duplicate	Precision (S & A)	1/10 field samples	NA	RPD </= 20% for concentrations >5 x QL	Qualify associated field data and/or resample.
Field Blank	Accuracy/ Bias as Contamination (S & A)	1/20 field samples	NA	concentration <QL	Qualify associated field data and/or resample.
Temperature Blank	Representative -ness	1/cooler of samples	NA	4°C +/- 2°C	Contact Tribe's Project Manager[4]
ANALYSIS:					
Laboratory Duplicate	Precision (A)	1/ batch of up to 20 samples	RPD </= 20% for concentrations >5 x QL	RPD </= 20% for concentrations >5 x QL	Review with lab manager. Reanalyze or justify in data report.
Laboratory Blank	Accuracy/ Bias as Contamination (A)	1/ batch of up to 20 samples	concentration <½ QL or associated sample concentration >10x blank value	concentration <½ QL or associated sample concentration >10x blank value	Reprep and reanalyze. If problem recurs, reprep and reanalyze blank and all associated samples.
Matrix Spike	Accuracy/ Bias as Recovery (S & A)	1/batch of up to 20 samples	70-130% recovery of true value	70-130% recovery of true value	Reprep and reanalyze. If problem recurs, justify in data report.
Laboratory Control Sample	Accuracy/ Bias as Recovery (A)	1/batch of up to 20 samples	70-130% recovery of true value	70-130% recovery of true value	Review with lab manager. Reanalyze or justify in data report.

NOTES:

[1] Data Quality Indicators may be related to sampling (S) and/or analysis (A) activities.

[2] For field QC samples, there are no method-specific QC acceptance limits. (NA - Not applicable.)

[3] The information in this column supports acceptance criteria/measurement performance criteria introduced in Section 1.7.3. For this study, the laboratory's QC acceptance limits were reviewed and found acceptable to meet the current data quality needs. As such, the laboratory's QC acceptance limits and the project's measurement performance criteria are equivalent.

[4] Tribe's project manager will make decision on how to proceed on a case-by-case basis. At a minimum, a note will be included with the data report from the laboratory.

ALL SAMPLES ARE SURFACE WATER MATRIX. ALL SAMPLES ARE COLLECTED BY THE SAME PROCEDURE, AS PRESENTED IN APPENDIX A.

Anion analyses include those listed in Tables 1-1 & 2-3.

Table 2-4C. Quality Control Requirements for Laboratory Analyses (Surface Water Analysis of Total Dissolved Solids) Surface Water Monitoring Program

Analytical Method/SOP: EPA Method 160.1

QC Sample:	Data Quality Indicator (DQI)[1]	Frequency/ Number	Method/SOP QC Acceptance Limits[2]	Acceptance Criteria/ Measurement Performance Criteria[3]	Corrective Action
FIELD:					
Field Duplicate	Precision (S & A)	1/10 field samples	NA	RPD </= 20%	Qualify associated field data and/or resample.
Temperature Blank	Representative -ness	1/cooler of samples	NA	4°C +/- 2°C	Contact Tribe's Project Manager[4]
ANALYSIS:					
Laboratory Duplicate	Precision (A)	1/ batch of up to 20 samples	RPD </= 20%	RPD </= 20%	Review with lab manager. Reanalyze or justify in data report.
Laboratory Blank	Accuracy/ Bias as Contamination (A)	1/ batch of up to 20 samples	concentration <QL	concentration <QL (20 mg/L)	Reprep and reanalyze. If problem recurs, reprep and reanalyze blank and all associated samples.
Laboratory Control Sample (20 mg/L KCl in water)	Accuracy/ Bias as Recovery (A)	1/batch of up to 20 samples	70-130% recovery of true value	70-130% recovery of true value	Reprep and reanalyze all associated samples.

NOTES:

[1] Data Quality Indicators may be related to sampling (S) and/or analysis (A) activities.

[2] For field QC samples, there are no method-specific QC acceptance limits. (NA - Not applicable.)

[3] The information in this column supports acceptance criteria/measurement performance criteria introduced in Section 1.7.3. For this study, the laboratory's QC acceptance limits were reviewed and found acceptable to meet the current data quality needs. As such, the laboratory's QC acceptance limits and the project's measurement performance criteria are equivalent.

[4] Tribe's project manager will make decision on how to proceed on a case-by-case basis. At a minimum, a note will be included with the data report from the laboratory.

ALL SAMPLES ARE SURFACE WATER MATRIX. ALL SAMPLES ARE COLLECTED BY THE SAME PROCEDURE, AS PRESENTED IN APPENDIX A.

Table 2-4D. Quality Control Requirements for Laboratory Analyses (Surface Water Analysis of Alkalinity) Surface Water Monitoring Program

Analytical Method/SOP: SM 2320B

QC Sample:	Data Quality Indicator (DQI)[1]	Frequency/ Number	Method/SOP QC Acceptance Limits[2]	Acceptance Criteria/ Measurement Performance Criteria[3]	Corrective Action
FIELD:					
Field Duplicate	Precision (S & A)	1/10 field samples	NA	RPD </= 20%	Qualify associated field data and/or resample.
Temperature Blank	Representative -ness	1/cooler of samples	NA	4°C +/- 2°C	Contact Tribe's Project Manager[4]
ANALYSIS:					
Laboratory Duplicate	Precision (A)	1/ batch of up to 20 samples	RPD </= 20%	RPD </= 20%	Review with lab manager. Reanalyze or justify in data report.
Laboratory Blank	Accuracy/ Bias as Contamination (A)	1/ batch of up to 20 samples	concentration <QL (10 mg/L)	concentration <QL (10 mg/L)	Reprep and reanalyze. If problem recurs, reprep and reanalyze blank and all associated samples.
Laboratory Control Sample (as 100 mg/L $CaCO_3$)	Accuracy/ Bias as Recovery (A)	1/batch of up to 20 samples	85-115% recovery of true value	85-115% recovery of true value	Reprep and reanalyze all associated samples.

NOTES:

[1] Data Quality Indicators may be related to sampling (S) and/or analysis (A) activities.

[2] For field QC samples, there are no method-specific QC acceptance limits. (NA - Not applicable.)

[3] The information in this column supports acceptance criteria/measurement performance criteria introduced in Section 1.7.3. For this study, the laboratory's QC acceptance limits were reviewed and found acceptable to meet the current data quality needs. As such, the laboratory's QC acceptance limits and the project's measurement performance criteria are equivalent.

[4] Tribe's project manager will make decision on how to proceed on a case-by-case basis. At a minimum, a note will be included with the data report from the laboratory.

ALL SAMPLES ARE SURFACE WATER MATRIX. ALL SAMPLES ARE COLLECTED BY THE SAME PROCEDURE, AS PRESENTED IN APPENDIX A.

Table 2-4E. Quality Control Requirements for Laboratory Analyses (Surface Water Analysis of Total Coliforms/E. Coli) Surface Water Monitoring Program

Analytical Method/SOP: SM 9223

QC Sample:	Data Quality Indicator (DQI)[1]	Frequency/ Number	Method/SOP QC Acceptance Limits[2]	Acceptance Criteria/ Measurement Performance Criteria[3]	Corrective Action
FIELD:					
Field Duplicate	Precision (S & A)	1/10 field samples	NA	Presence/ absence same as original sample	Qualify associated field data and/or resample.
Temperature Blank	Representative -ness	1/cooler of samples	NA	4°C +/- 2°C	Contact Tribe's Project Manager[4]
ANALYSIS:					
Laboratory Duplicate	Precision (A)	1/ batch of up to 20 samples	Presence/ absence same as original sample	Presence/ absence same as original sample	Review with lab manager. Reanalyze or justify in data report.
Laboratory Blank	Accuracy/ Bias as Contamination (A)	1/ batch of up to 20 samples	No presence of total coliform or e. coli	No presence of total coliform or e. coli	Reprep and reanalyze. If problem recurs, reprep and reanalyze blank and all associated samples.
Laboratory Control Sample	Accuracy/ Bias as Recovery (A)	1/batch of up to 20 samples	Presence for positive controls/ absence for negative controls	Presence for positive controls/ absence for negative controls	Reprep and reanalyze all associated samples.

NOTES:

[1] Data Quality Indicators may be related to sampling (S) and/or analysis (A) activities.

[2] For field QC samples, there are no method-specific QC acceptance limits. (NA - Not applicable.)

[3] The information in this column supports acceptance criteria/measurement performance criteria introduced in Section 1.7.3. For this study, the laboratory's QC acceptance limits were reviewed and found acceptable to meet the current data quality needs. As such, the laboratory's QC acceptance limits and the project's measurement performance criteria are equivalent.

[4] Tribe's project manager will make decision on how to proceed on a case-by-case basis. At a minimum, a note will be included with the data report from the laboratory.

ALL SAMPLES ARE SURFACE WATER MATRIX. ALL SAMPLES ARE COLLECTED BY THE SAME PROCEDURE, AS PRESENTED IN APPENDIX A.

Table 2-5. Quality Control Requirements for Field Measurements (Surface Water Field Measurements Parameters) Surface Water Monitoring Program

Field Parameter: Temperature, pH, Dissolved Oxygen, Turbidity, Conductivity/Specific Conductance[1]

QC Sample:	Data Quality Indicator (DQI)[2]	Frequency/ Number	Method/SOP QC Acceptance Limits[3]	Acceptance Criteria/ Measurement Performance Criteria[4]	Corrective Action
Temperature - Multimeter Sensor (Manufacturer Brand Q, Model A)					
Field Duplicate	Precision (S & A)	1/5 field samples	NA	±0.5°C	Collect & analyze 3rd sample. Qualify data, if still exceeding criteria.
QC Check Sample[5]	Accuracy	NA	NA	NA	None. Sensor not used if didn't meet annual calibration criteria.
pH - Multimeter Electrode (Manufacturer Brand Q, Model A)					
Field Duplicate	Precision (S & A)	1/5 field samples	NA	±0.3 pH units	Collect & analyze 3rd sample. Qualify data, if still exceeding criteria.
QC Check Sample[6]	Accuracy	1/batch (each day)	±0.5 units of true value for both calibration check standards	±0.5 units of true value	Qualify associated field data.
Dissolved Oxygen - Multimeter Membrane Electrode (Manufacturer Brand Q, Model A)					
Field Duplicate	Precision (S & A)	1/5 field samples	NA	±20% RPD	Collect & analyze 3rd sample. Qualify data, if still exceeding criteria.
QC Check Sample[6]	Accuracy	1/batch (each day)	±0.5 mg/L of true value of full saturation standard	±0.5 mg/L of true value	Qualify associated field data.
Turbidity - Multimeter Sensor (Manufacturer Brand Q, Model A)					
Field Duplicate	Precision (S & A)	1/5 field samples	NA	±20% RPD	Collect & analyze 3rd sample. Qualify data, if still exceeding criteria.

Table 2-5. (Continued) Quality Control Requirements for Field Measurements (Surface Water Field Measurements Parameters) Surface Water Monitoring Program

QC Sample:	Data Quality Indicator (DQI)[2]	Frequency/ Number	Method/SOP QC Acceptance Limits[3]	Acceptance Criteria/ Measurement Performance Criteria[4]	Corrective Action
Turbidity - Multimeter Sensor (Manufacturer Brand Q, Model A)					
QC Check Sample[6]	Accuracy	1/batch (each day)	±20% or ±2 NTU of 20 NTU standard (whichever is greater) and ±1 NTU for 0 NTU standard	±20% of true value	Qualify associated field data.
Conductivity/Specific Conductance - Multimeter Sensor (Manufacturer Brand Q, Model A)					
Field Duplicate	Precision (S & A)	1/5 field samples	NA	±20% RPD	Collect & analyze 3rd sample. Qualify data, if still exceeding criteria.
QC Check Sample[6]	Accuracy	1/batch (each day)	±10% of true value or ±20 µS/cm (whichever is greater) for both calibration check standards	±10% of true value	Qualify associated field data.

NOTES:

[1] Methods are provided in Appendix A-2.

[2] Data Quality Indicators may be related to sampling (S) and/or analysis (A) activities.

[3] For field duplicate samples, there are no method-specific QC acceptance limits. (NA - Not applicable.)

[4] The information in this column supports acceptance criteria/measurement performance criteria introduced in Section 1.7.3. For this study, the field measurement's QC acceptance limits (as determined from a calibration check sample analyzed half-way through the field day) were reviewed and found acceptable to meet the current data quality needs. As such, the field measurement's QC acceptance limits and the project's measurement performance criteria are equivalent.

[5] Accuracy is not ensured through the analysis of a QC check. If the temperature sensor meets the annual calibration procedures and criteria presented in Table 2-6, the measurements are considered accurate enough to meet the needs of the current project.

[6] Accuracy is ensured through the calibration and calibration check process presented in Table 2-6. The post calibration check sample(s) will be considered as QC check samples for the field measurements.

ALL SAMPLES ARE SURFACE WATER MATRIX. ALL SAMPLES ARE COLLECTED BY THE SAME PROCEDURE, AS PRESENTED IN APPENDIX A. NO ADDITIONAL QC CHECKS ARE PLANNED BEYOND THOSE IDENTIFIED ABOVE FOR ACCURACY AND PRECISION.

Table 2-6. Field Equipment/Instrument Calibration, Maintenance, Testing, and Inspection
Surface Water Monitoring Program

Analytical Parameter	Instrument	Calibration Activity	Maintenance & Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action
Temperature (sensor)	Multimeter, Manufacturer Brand Q, Model A	Annual check of endpoints of desired temperature range (0°C to 40°C) versus NIST thermometer	See manufacturer's manual	Annually	±0.2°C of true value at both endpoints (i.e., manufacturer's listed accuracy for the sensor)	Remove from use if doesn't pass calibration criteria.
pH (electrode)	Multimeter, Manufacturer Brand Q, Model A	Initial: two-point calibration bracketing expected field sample range (using 7.0 and either 4.0 or 10.0 pH buffer, depending on field conditions); followed by one-point check with 7.0 pH buffer Post: single-point check with 7.0 pH buffer	See manufacturer's manual	Initial: beginning of each day Post: end of each day	Initial: two-point calibration done electronically; one-point check (using 7.0 pH buffer) ± 0.1 pH units of true value Post: ±0.5 pH units of true value with both 7.0 pH and other "bracketing" (either 4.0 of 10.0 pH) buffer	Recalibrate Qualify data
Dissolved Oxygen (membrane electrode)	Multimeter, Manufacturer Brand Q, Model A	Initial: One-point calibration with saturated air (need temp, barometric pressure); followed by two-point check with saturated air and zero Post: single-point check at full saturation	See manufacturer's manual	Initial: beginning of each day Post: end of each day	Initial: one-point calibration done electronically; two-point check with high (saturated) standard ± 0.2 mg/L of true value and low (zero) standard <0.5 mg/L Post: ±0.5 mg/L of true saturated value	Recalibrate; change membrane & recalibrate Qualify data

Table 2-6. (Continued) Field Equipment/Instrument Calibration, Maintenance, Testing,

and Inspection
Surface Water Monitoring Program

Analytical Parameter	Instrument	Calibration Activity	Maintenance & Testing/ Inspection Activity	Frequency	Acceptance Criteria	Corrective Action
Turbidity (sensor)	**Multimeter, Manufacturer Brand Q, Model A**	**Initial: two-point calibration using 0 NTU (or deionized water) and 20 NTU standards to bracket expected sample range; followed by one-point check with 20 NTU standard** **Post: two-point check with high (20 NTU) and low (0 NTU) standards**	**See manufacturer's manual**	**Initial: beginning of each day** **Post: end of each day**	**Initial: two-point calibration done electronically; one-point check (using 20 NTU standard) ±10% of true value** **Post: two-point check with high (20 NTU) standard ±20% or ±2 NTU (whichever is greater) of true value and low (0 NTU) standard ±1 NTU of true value**	**See manufacturer's manual** **Quality data**
Conductivity/ Specific Conductance (sensor)	**Multimeter, Manufacturer Brand Q, Model A**	**Initial: one-point calibration at high (using 500 µS/cm standard) end of expected field sample range; followed by two-point check with high (500 µS/cm) and low (100 µS/cm) standards** **Post: two-point check with high (500 µS/cm) and low (100 µS/cm) standards**	**See manufacturer's manual**	**Initial: beginning of each day** **Post: end of each day**	**Initial: one-point calibration done electronically; two-point check with high (500 µS/cm) standard ±5% of true value and low (100 µS/cm) standard ±10% of true value** **Post: two-point check with high (500 µS/cm) and low (100 µS/cm) standards ±10% of true value or ±20 µS/cm, whichever is greater**	**Recalibrate** **Qualify data**

NOTES: Step-by-step procedures for calibration are described in the SOPs included in Appendix A-2.

APPENDICES

APPENDIX A
FIELD STANDARD OPERATING PROCEDURES

Appendix A-1: Field Sampling

Appendix A-2: Field Measurements

Appendix A-3: Global Positioning System (GPS) Measurements

Appendix A-4: Field Documentation (Chain-of-Custody Form, Custody Seal, & Sample Label)

APPENDIX B
NORTH FACE ANALYTICAL LABORATORY
QUALITY ASSURANCE MANUAL

APPENDIX C
LABORATORY STANDARD OPERATING PROCEDURES

Appendix C-1: Metals

- **C-1A: based on EPA 200.7**
- **C-1B: based on EPA 200.8**
- **C-1C: based on EPA 245.1**

Appendix C-2: Hardness, based on SM 2340B

Appendix C-3: Anions, based on EPA 300.0

Appendix C-4: Total Dissolved Solids, based on EPA 160.1

Appendix C-5: Alkalinity, based on SM 2320B

Appendix C-6: Total Coliform/E. Coli, based on SM 9223

APPENDIX D
STANDARD OPERATING PROCEDURE
INSTRUCTIONS FOR SAMPLE CUSTODY, SHIPPING AND DOCUMENTATION

APPENDIX E
HEALTH AND SAFETY PLAN